Am. B.

Proceedings

3040

(345)

THE

EXECUTIVE DOCUMENTS

PRINTED BY ORDER OF THE

SENATE OF THE UNITED STATES

FOR THE

FIRST SESSION OF THE FORTY-SEVENTH CONGRESS.

IN SEVEN VOLUMES.

Volume 1.—Nos. 1 to 36, inclusive.
Volume 2.—Nos. 37 to 70, inclusive, except No. 49.
Volume 3.—No. 49 (Coast Survey).
Volume 4.—Nos. 71 to 88, inclusive.
Volume 5.—Nos. 89 to 158, inclusive.
Volume 6.—Nos. 159 to 197, inclusive, except No. 196.
Volume 7.—No. 196.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1882.

BIBLIOTHECA
REGIA
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OF THE

SENATE OF THE UNITED STATES

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47TH CONGRESS, 1st Session. } SENATE. { EX. DOC. No. 1.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING

A copy of a report of Brig. Gen. Nelson A. Miles, dated September —, 1881, of an inspection of Forts Cœur d'Alene and Colville, and Camp Spokane, Washington Territory, with the indorsement of the General of the Army, in which he recommends an appropriation of $40,000 *for a permanent military post in Northern Washington Territory, &c.*

DECEMBER 7, 1881.—Referred to the Committee on Military Affairs and ordered to be printed.

WAR DEPARTMENT,
Washington City, December 5, 1881.

The Secretary of War has the honor to transmit to the United States Senate a copy of a report of Brig. Gen. Nelson A. Miles, commanding Department of the Columbia, dated September —, 1881, of an inspection of Forts Cœur d'Alene and Colville, and Camp Spokane, Washington Territory, with an indorsement thereon of the General of the Army, in which he recommends that a specific appropriation of $40,000 be asked for, to build a permanent military post in Northern Washington Territory, to replace old Fort Colville, now in decay. This fort is necessary for the protection of the frontier settlements east of the great plain of the Columbia River, and the appropriation asked for by the General of the Army is respectfully recommended to the favorable consideration of Congress.

ROBERT T. LINCOLN,
Secretary of War.

The PRESIDENT *pro tempore*
of the United States Senate.

HEADQUARTERS DEPARTMENT OF THE COLUMBIA,
Vancouver Barracks, September —, 1881.

SIR: After an inspection of Forts Cœur d'Alene, Colville, and Camp Spokane, and investigating the necessity for troops along that frontier, I have the honor to submit the following as the result of my observations:

Fort Cœur d'Alene is a well-built post; the buildings are of a permanent character, with ample accommodation for six companies of infantry; location, healthful; and the present garrison, four companies Second Infantry, in good condition. The post is now within eight miles of Westwood, a station on the Northern Pacific Railroad; can easily be supplied, and the troops quickly moved. The command gives security to the settlements in that district, and is also an available reserve force.

At Fort Colville I found the remains of a log camp or temporary depot that has been enlarged and miscalled a military post. Owing to the fact that the Canadian authorities occupied old Fort Colville, on the Columbia River, the present site was selected as a temporary camp or depot for the boundary survey.

Most of the quarters are built of logs. Some are in good repair, but the majority are in process of rapid decay; a portion of the barracks are now propped up, to prevent their falling upon the occupants. If any force is ever needed in that vicinity, it should be on the Columbia River, where it would command the avenues of travel by Indians. The present site is objectionable, as it is commanded on three sides by high hills or mountains within close range. The only settlements in that district are those scattered along a narrow valley between two mountain ranges. The first settlements there were made chiefly by employés of the Hudson's Bay Company. These have intermarried with the Indians, so that now the valley has quite a mixed population. The Colville Indians do not live upon their reservation, but mingle with the whites, and subsist chiefly upon products obtained from the cultivation of the ground. I have directed a military road cut from near the center of the valley to Camp Spokane, distant about forty miles, and from the above-named post all necessary protection can be given.

At Camp Spokane I found four companies Second Infantry, which evidently had had a very laborious and severe experience during the last two years. They have performed a great amount of hard work, but it seems to have been misdirected. One company was entirely in tents and three in log huts covered with boards and canvas—both officers and men. These structures are unsuitable for shelter, and connot be made habitable without an expenditure of several thousand dollars. The dry, sandy soil in that region makes it impossible to use earth to advantage in the construction of huts or buildings.

The work of building a permanent post had been carried forward to the extent of preparing lumber and constructing six sets of officers' quarters, according to the drawings of military buildings recommended to the Secretary of War by the board on the revision of the Army Regulations, dated Quartermaster-General's Office, Washington, D. C., September 14, 1872, framed, rough-boarded, and partly shingled. (Memorandum description of all buildings herewith inclosed.) To partly complete this post for four companies of infantry would require $10,000. Under the circumstances, I deemed the removal of the two companies to Cœur d'Alene advisable for the winter, and until one important question was determined upon by superior authorities, namely, the question of concentrating or dividing the force necessary to be maintained in that district. In my opinion, the force as now divided is of little value in time of peace, and in case of Indian hostilities would be inadequate and ineffective.

A broad field of settlements has spread over the country south of the Spokane and Columbia rivers, east of the great plain of the Columbia; *these are as much exposed and need protection more than any body of citizens in this department.*

Some well-founded complaints have been made of depredations, by Indians and Chief Moses complained that white men were trespassing on his reservation, principally near the mouth of the Okinakane River.

A battalion of infantry is not a suitable force to properly patrol that extensive country, and prevent disturbance between whites and Indians.

Camp Spokane is located where its force can easily reach the Colville Valley settlements to the east, cover the settlements south of Spokane and Columbia rivers, and at the same time watch the country as far west as the mouth of the Okinakane River. In the spring a command of four companies of infantry and two to four companies of cavalry, with suitable transportation, should, in my opinion, take permanent station at that point. All supplies of fuel and forage can be furnished in the immediate vicinity, and the balance of stores can be drawn with government transportation from Sprague, a station on the Northern Pacific Railway, distant fifty-four miles. In view of the urgent necessities of the large number of settlers; the expressed wishes of the Indians; the inexpensive means of obtaining material and supplies; the fact that Indian trails concentrate near that point, and that the Indians congregate there during the summer to catch and dry salmon; and the prospect of a strong, effective force being needed in that vicinity during the next five or ten years at least. I recommend the construction of a post to accommodate six to eight companies of infantry and cavalry at or near the mouth of the Spokane River. The material already at Camp Spokane, and what can be used out of Fort Colville, will go far toward building the new post; and in addition I would recommend the sum of $40,280.07 for construction of post, and $13,000 for purchase of machinery and skilled labor for building steamboat according to quartermaster's estimates herewith inclosed.

A small, powerful steamer will be required on the Columbia River; the machinery can be purchased here, and the boat built at the mouth of the Spokane River. The accompanying map of Lieutenant Symons will show location of posts, Indian reservations, and settlements. The Northern Pacific engineers are now examining a route up the Yakima River, with a view of constructing a railroad up that valley towards

Puget Sound. Settlements are already moving in that direction, also up the Columbia, and eventually another post may be required north of the above settlements and between them and the west side of Moses' reservation, but that is a question of the future.

The above, in my opinion, will be the best disposition of troops in that region for several years, and I therefore recommend its adoption.

Very respectfully, your obedient servant,

NELSON A. MILES,
Brigadier-General, Commanding.

The ASSISTANT ADJUTANT-GENERAL,
Military Division of the Pacific, Presidio of San Francisco, Cal.

MEMORANDUM DESCRIPTION OF BUILDINGS OF CAMP SPOKANE, WASH., AUGUST 24, 1881.

Commanding Officer's quarters.

(No. 1.)

Stone foundation complete, frame up, and rough boarded roof and cornice; dormer windows complete, water table on, window and outside door frames set; all of outside finish, so far as it is in, is primed; first floor rough is laid, roof shingled. No chimneys up. Inside partitions up.

Officers' quarters.

(Double set, No. 2.)

Stone piers, frame up, and rough boarded; partially covered with rustic (10 squares), roof on, shingled; cornice complete, dormer windows complete, except shingling; water table on, window and outside door frames set; all of outside finish, so far as it is on, is primed; first and second floors, rough, are laid. No chimneys up. Inside partitions up.

Officers' quarters.

(Double set, No. 3.)

Stone piers, frame up, and rough boarded; partially covered with rustic (about 15 squares), roof "L" main part roughly boarded and not shingled; roof to kitchen shingled, cornice partially on; dormer windows not complete; about three-fourths finished; water table on, window and door frames set; all of outside finish, so far as it is on, is primed; first and second floors, rough, are laid. No chimneys. Inside partitions up. About two-thirds of kitchen lathed.

Officers' quarters.

(Double set, No. 4.)

Same conditions as officers' quarters No. 3, except there are no dormer windows and no rustic.

Officers' quarters.

(Double set, No. 5.)

Same condition as officers' quarters No. 4, except that there is no lathing on kitchen.

Officers' quarters.

(Double set, No. 6.)

Same condition as officers' quarters No. 5. The staging about all six sets of officers' quarters is up.

Companies D, E, and F are in log buildings, 92 by 16 feet, each 8 feet high. Windows sufficiently light, each set of company quarters, doors, roof covered with rough boards, and in each set a ventilator roof; floors of rough boards.

Guard house is 12 by 23 feet, built of logs; windows, door of rough boards, and floor of same; roof of rough boards.

Blacksmith's and wheelwright's shops are under the same roof of rough boards, built of logs; wheelwright's shop has windows and rough board floor, door of same material; blacksmith's shop no floor, door of rough boards; 72 by 22 feet.

Two grain storehouses, one quartermaster's storehouse, two commissary storehouses, and the office of the commissary and quartermaster (one building) are each as follows: Built of logs, covered with paulins stretched over frame, rough board door, rough board floor. In quartermaster and commissary office, in addition, is rough board floor. The dimensions are as follows:

The subsistence storehouse and middle grainhouse are 39 by 16 feet.

One quartermaster's storehouse is 49 by 19 feet.

Two quartermaster's storehouses are each 52 by 20 feet.

The saw-mill, situated on bench above the camp, is 30 by 50 feet, frame, covered with boards.

Estimate of the amount of money required for the construction of a military post for four companies of infantry and two of cavalry at or near Camp Spokane, Washington Territory, and the machinery for a steamboat at that point.

6 sets company barracks, at $2,945.86 each		$17,675 16
1 commanding officer's quarters		2,914 07
6 double sets company officers' quarters, at $3,104.32 each		18,625 92
1 commissary storehouse		1,603 68
1 quartermaster storehouse		1,847 76
1 guardhouse		1,490 54
2 stables, at $2,122.79 each		4,245 58
		48,402 71
Deduct for work already done and material on hand		8,122 64
Required under appropriation for barracks and quarters		40,280 07
Machinery for steamboat (about 125 tons burden)	$12,000 00	
Small engine in bow for lining over rapids	1,000 00	
Required under appropriation for Army transportation		13,000 00
Total		53,280 07

Plans of buildings same as those furnished from the Quartermaster-General's Office, except the stables and quartermaster storehouse.

Respectfully submitted,

G. B. DANDY,
Chief Quartermaster.

HEADQUARTERS DEPARTMENT OF THE COLUMBIA,
OFFICE OF CHIEF QUARTERMASTER,
Vancouver Barracks, Wash., September 9, 1881.

[First indorsement.]

HEADQUARTERS DIVISION OF THE PACIFIC,
AND DEPARTMENT OF CALIFORNIA,
September 28, 1881.

The objections to a large post, as recommended on the Spokane, so near the large post heretofore located by the General of the Army on Lake Cœur d'Alene, is that it places too many troops in proportion in eastern Washington Territory to the neglect of the country west of these posts. (See map inclosure No. 3.) The settlements on the Upper Yakima have frequently been in fear, and there will be nothing between Moses' reservation and these settlements.

It will be seen that there are several reservations, each of 640 acres, proposed. I think this is forbidden by law in this Territory.* General Miles has been on the spot, and his judgment is entitled to great consideration.

Very respectfully,

IRVIN McDOWELL,
Major-General Commanding Division and Department.

* MEMO.—The proposed post reservation only has been approved by the War Department, and the lands, 640 acres, have been temporarily withdrawn by the Interior Department.

[Second indorsement.]

HEADQUARTERS OF THE ARMY,
Washington, October 10, 1881.

Respectfully submitted to the Hon. Secretary of War, recommending that he submit this report to Congress and ask for a specific appropriation of $40,000 to build a permanent military post in northern Washington Territory to replace old Fort Colville, now in decay.

W. T. SHERMAN,
General.

WASHINGTON

OREGON

IDAHO

MONTANA

COLVILLE INDIAN RESERVATION

OKANAGAN INDIAN RESERVATION

SPOKANE INDIAN RESERVATION

COEUR D'ALENE INDIAN RESERVATION

FLATHEAD INDIAN RESERVATION

GROS VENTRES

NEZ PERCES INDIAN RESERVATION

YAKIMA INDIAN RESERVATION

UMATILLA INDIAN RESERVATION

WARM SPRING INDIAN RESERVATION

KLAMATH INDIAN RESERVATION

MALHEUR INDIAN RESERVATION

LEMHI INDIAN RESERVATION

SHOSHONE AND BANNOCK INDIAN RESERVATION

Western Shoshone Ind. Res.

Quinaielt Ind. Res.

Shoalwater Ind. R.

Cowlitz Ind. R.

Chehalis Ind. R.

Muckleshoot I.R.

Squalli I.R.

Port Madison I.R.

Port Gamble I.R.

Lummi Ind. Res.

Swinomish I.R.

Tulalip I.R.

Grand Ronde Ind. Res.

Siletz Ind. Res.

Coos Bay Ind. Res.

Umpqua Ind. Res.

Rogue R. Ind. Res.

Table Bluff Ind. Res.

Smith's Riv. Ind. Res.

Cape Flattery Ind. Res.

Cape Alava Ind. Res.

Destruction Id.

Bonilla Pt.

Pt Roberts

Cape Flattery

Cape Alava

Pt Grenville

Pt Brown

Gray's Harbor

Pt Leadbetter

Oysterville

Cape Disappointment

Columbia River

Tillamook Head

False Tillamook

Cape Meares

Cape Lookout

Cape Foulweather

Yaquina Pt.

Cape Perpetua

Cape Gregory

Cape Blanco

Pt St George

False Klamath

Cape Mendocino

Cape Scott

Cape Lazo

Cape Roberts

Cape Mudge

Cape Lookout

Cape Alava

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Cape Perpetua

Cape Gregory

Cape Blanco

Pt St George

False Klamath

Cape Mendocino

Cape Scott

Cape Lazo

Cape Roberts

Cape Mudge

STRAIT OF JUAN DE FUCA

VICTORIA

Whatcom

Mt Baker

Lummi Ind. Res.

San Juan

Coveland

New Dungeness

Port Townsend

Port Ludlow

Port Gamble

Port Madison

Seattle

Mt Olympus

Mt Constance

Destruction Id.

Quinaielt L.

Quinaielt R.

Skokomish R.

Oakland

Olympia

Montesano

Chehalis R.

Chehalis Ind. R.

Shoalwater Ind. R.

Shoalwater Bay

Oysterville

Nisqually I.R.

Muckleshoot I.R.

Puyallup

Steilacoom

Tacoma

Mt Rainier

Mt St Helens

Mt Adams

Mt Hood

Vancouver

Portland

Oregon City

Milton

Walla Walla

Dayton

Yakima

Ahtanum

Konnewack

Walluta

Snoqualmie

Skykomish

Wenatchee

Entiat

Chelan

Okanogan

Methow

Similkameen

Kettle

Columbia

Snake

Yakima River

Walla Walla River

Willamette

Tualatin

Clackamas

Columbia River

Snake River

Blue Mountains

Cascade Mts

Coast Range

Rocky Mts

Bitter Root Mts

Salmon River Mts

Blue Mts

Wallowa Mts

Ochoco Mts

Cascade Range

Siskiyou Mts

Klamath Mts

Coast Range

Rocky Mts

Bitter Root Mts

Salmon River Mts

Blue Mts

Wallowa Mts

Ochoco Mts

Cascade Range

Siskiyou Mts

Klamath Mts

Columbia River

Snake River

Yakima River

Walla Walla River

Willamette

Tualatin

Clackamas

Columbia River

Snake River

Blue Mountains

Cascade Mts

Coast Range

Rocky Mts

Bitter Root Mts

Salmon River Mts

Blue Mts

Wallowa Mts

Ochoco Mts

Cascade Range

Siskiyou Mts

Klamath Mts

GREAT PLAIN OF THE COLUMBIA RIVER

DESERT

ELEVATED PLATEAU

GREAT BASIN

NORTHERN PACIFIC RAILROAD

BRANCH LINE NORTH PACIFIC R.R.

SOUTH PACIFIC R.R.

Spokane Falls & Northern R.R.

Coeur d'Alene R.R.

Old Ft Colville

Old Ft Okanagan

Old Ft Walla Walla

Old Ft Boise

Old Ft Hall

Old Ft Owen

Old Ft Shaw

Old Ft Lapwai

Old Ft Harney

Old Ft Klamath

Old Ft Bidwell

Old Ft Crook

Old Ft Boise

Old Ft Hall

Old Ft Owen

Old Ft Shaw

Old Ft Lapwai

Old Ft Harney

Old Ft Klamath

Old Ft Bidwell

Old Ft Crook

Colville

Spokane

Walla Walla

Dayton

Pomeroy

Colfax

Palouse

Pullman

Moscow

Lewiston

Asotin

Clarkston

Pierce City

Orofino

Mount Idaho

Grangeville

Salmon City

Leesburg

Challis

Deadwood

Idaho City

Boise City

Rocky Bar

Pine Grove

Big Camas Prairie

Rocky Desert

Lost River

Big Butte

Small lava hillocks and sage brush

Small low broken ridges of Bonneville Rock and dense growth of sage brush

Lake or Shoshone Rii-

Shoshone Falls

Rock Creek

Malade City

Malade

Virginia City

Helena

Deer Lodge City

Gallatin

Madison

Jefferson

Missouri

Yellowstone

Milk River

Marias River

Sun River

Teton River

Muddy Creek

Old Agency

Cascade Mt

Sun River

Fort Shaw

Fort Benton

Fort Owen

Fort Lapwai

Fort Hall

Fort Boise

Fort Walla Walla

Fort Colville

Fort Okanagan

Fort Simpson

Fort Rupert

Fort Langley

Fort Victoria

Fort Nisqually

Fort Vancouver

Fort Umpqua

Fort Jones

Fort Crook

Fort Bidwell

Fort Klamath

Fort Harney

Fort Boise

Fort Hall

Fort Owen

Fort Shaw

Fort Lapwai

Fort Walla Walla

Fort Colville

Fort Okanagan

Fort Simpson

Fort Rupert

Fort Langley

Fort Victoria

Fort Nisqually

Fort Vancouver

Fort Umpqua

Fort Jones

Fort Crook

Fort Bidwell

Fort Klamath

Fort Harney

Camp Curry

Camp Wright

Camp Three Forks

Camp McDermit

Camp Scott

Camp Curry

Camp Wright

Camp Three Forks

Camp McDermit

Camp Scott

Union

Baker City

Canyon City

Auburn

Boise City

Idaho City

Rocky Bar

Challis

Deadwood

Salmon City

Leesburg

Virginia City

Helena

Deer Lodge City

Malade City

Silver City

Jordan Valley

Owyhee River

Malheur River

Burnt River

Powder River

Grande Ronde River

Salmon River

Middle Fork

South Fork

North Fork

Big Camas Prairie

Rocky Desert

Lost River

Big Butte

Lake or Shoshone Rii-

Shoshone Falls

Rock Creek

Malade

Sen. Ex. Doc. No. 1. 1st Sess. 47th Cong.

North

CAMP SPOKANE,

showing the proposed

MILITARY RESERVATIONS.

SURVEYED IN 1880 – 1881

under the direction of

LIEUT. T. W. SYMONS, CORPS of ENGINEERS.

by

W. T. Webber, Asst. Engineer.

Scale

Chains 40 30 20 10 0 1 2 miles

Variation 21° 30' East.

DESCRIPTION

POST RESERVE

1	South	46½	East	30.75	Chains
2	North	62½	East	22.75	"
3	North	27½	West	8.00	"
4	North	43¾	East	80.87	"
5	North	32½	West	52.95	"
6	South	77	West	4.53	"
7	South	56½	West	58.50	"
8	South	21¼	West	38.20	"
9	South	1½	East	30.50	

Containing 640 Acres more or less

WOOD RESERVE

1	South	45¾	East	80.00 Chains
2	North	44¼	East	80.00 "
3	North	45¾	West	80.00 "
4	South	44¼	West	80.00 "

Containing 640 Acres.

HAY RESERVE

1	South			32.74 Chains
2	East			40.66 "
3	South			60.00 "
4	East			40.00 "
5	North			40.00 "
6	East			40.00 "
7	North			40.00 "
8	West			80.00 "
9	North			20.00 "
10	West			33.40
11	South	45	West	10.27

Containing 640 Acres

PASTURE RESERVE

1	South	46½	East	.50	Chains
2	South	3	East	66.00	"
3	South	87	West	106.00	"
4	North	2	West	60.00	"
5	East			69.92	"
6	North	45½	East	22.90	"
7	South	64	East	13.70	"
8	North	68	East	6.00	"

Containing 640 Acres more or less

Sen. Ex. Doc. No. 1. 1st Sess. 47th Cong.

PLAN OF CAMP SPOKANE W. T.

AUGUST, 1881

FROM DATA FURNISHED BY LIEUT O. F. LONG, 5TH INFY A.D.C.

Prepared at Engineer Office Hd Qrs Dept Columbia.

Vancouver Barracks.
W. T.

15 x 17
15 x 17
16 x 17
20 x 19
15 x 17

6 47 x 39
5 47 x 39
4 47 x 39
3 47 x 39
2 47 x 39

Officers' Quarters

Lt Muhlenberg

Capt Mc Keever

Hospital

C. O. 1 40 x 40

Stable

Dry Qrs

Cattle Qrs

Wood Piles

Comy. S.H. 39 x 16

Comy Cellar

Q.M. & A.C.S. Office

Comy S.H. 39 x 16

Printing Office

Grain S.H. 39 x 16

Qr Mr S.H. 52 x 20

Guard House 12 x 23

Qr Mr S.H. 52 x 20

Qr Mr S.H. 49 x 16

Hay Scale

Co. K 2nd Inf'y Attends

Co. D 2nd Inf. 92 x 16

Co. F 2nd Inf. 92 x 16

Co. E 2nd Inf. 92 x 16

Water Tank 12 x 10 x 6

Hay

Hay

Corral 157 x 126 x 16

Corral

32 x 21

26 x 24

Wheelwright & Blacksmith Shop 72 x 22

Abd. Huts

Laundress Qrs.

Sen. Ex. Doc. No. 1. 1st Sess. 47th Cong.

47TH CONGRESS, 1st Session. } SENATE. { EX. DOC. No. 2.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING

A report relative to the employment of additional clerks in the Surgeon-General's Office, &c.

DECEMBER 7, 1881.—Referred to the Committee on Appropriations and ordered to be printed.

WAR DEPARTMENT,
Washington City, December 6, 1881.

The Secretary of War has the honor to report, for the information of Congress, that at the last session, while the legislative, executive, and judicial appropriation bill was under consideration, an amendment was agreed to providing for the employment of additional clerks in the Surgeon-General's Office, "to be exclusively engaged in preparing and making reports to expedite the settlement of pension applications called for by the Commissioner of Pensions." As the employment of this increased force would necessitate the purchase of furniture and the hire of a building for their accommodation (the force then employed being overcrowded), it seems to have been the intention to provide a sufficient sum for this purpose (see Congressional Record, February 21, 1881, vol. 11, part 3, pp. 1870–1872), and accordingly the bill was amended to read as follows:

For contingent expenses, namely, blank books, stationery, rent, fuel, gas, furniture, repairs, and incidentals, $18,000; $5,000 of which sum shall be available for the current fiscal year.

As amended, the bill became a law March 3, 1881 (21 Stat., p. 403).

But as the above quoted appropriation did not provide in terms for the rent of an additional building, the Secretary of War was without authority to use the appropriation made, in view of the prohibition contained in the following acts of Congress, viz:

Hereafter no contract shall be made for the rent of any building, or part of any building, to be used for the purposes of the government in the District of Columbia, until an appropriation therefor shall have been made in terms by Congress, and that this clause be regarded as notice to all contractors or lessors of any such building or any part of building.—(Act of Mar. 3, 1877, 19 Stat., p. 370.)

Where buildings are now rented for public use in the District of Columbia, the executive departments are authorized, whenever it shall be advantageous to the public interest, to rent others in their stead: *Provided*, That no increase in the number of buildings now in use, nor in the amount paid for rents, shall result therefrom.—(Act of June 15, 1880, 21 Stat., p. 228; and act of Mar. 3, 1881, 21 Stat., p. 404.)

The additional clerks authorized by the act were, however, employed, and until the 1st of July, 1881, as many clerks as could be accommodated were employed during the usual hours of business; the remainder of the force then came on duty and worked until ten o'clock at night. This plan answered for awhile, although very inconvenient, but

as the weather grew hotter it became imperatively necessary to provide other accommodations, and, accordingly, the offer of Mr. R. O. Holtzman, of June 4, 1881 (copy inclosed), was accepted, and, under a license granted by him (copy inclosed), the second and third stories of his building, situate on the northeast corner of F and Tenth streets northwest, were occupied as offices for a part of the force of the Surgeon-General's Office.

It is respectfully recommended that the Secretary of War be specially authorized to pay for the hire of the building during the current fiscal year, out of the appropriation already made, and that he be authorized to hire a building thereafter for the accommodation of these clerks during their employment, as was the evident intention of Congress when the law was passed.

ROBERT T. LINCOLN,
Secretary of War.

The PRESIDENT *pro tempore*
Of the United States Senate.

[Office of R. O. Holtzman, real estate broker and auctioneer, F and Tenth streets, N. W.]

WASHINGTON, D. C., *June* 4, 1881.

DEAR SIR: I understand that they are very much crowded at the Medical Museum, a branch office of the Surgeon-General, so much so that the force employed there is divided into day and night work, all of the employés not being able to work in the building at the same time, and the sanitary condition of the building is bad.

The second and third stories of my new building, constructed especially for office purposes, and now occupied by the Census Office, will be vacated by them by the 1st of July next, and I now offer them to the Surgeon-General at $125 a month (the price paid by the Census Office), and on the following terms and conditions, viz, that I will not expect rent to be paid until some provision for payment is made by legislation, expecting, of course, the good offices of yourself and the Surgeon-General to assist in such legislation.

The building was looked into by some one from the department some months ago. It will accommodate fifty or sixty clerks comfortably, and has all the conveniences necessary for such accommodations.

Very respectfully, your obedient servant,

R. O. HOLTZMAN.

Hon. ROBERT T. LINCOLN,
Secretary of War.

WASHINGTON, D. C., *June* 20, 1881.

To whom it may concern:

The undersigned, owner of the building situated on the northeast corner of F and Tenth streets, northwest, in the city of Washington, D. C., hereby grants authority and permission to the Surgeon-General of the United States Army to occupy and use for offices for officers and clerks engaged in public service in the bureau under his charge all of the second and third stories of said building, for the term of one year, from the 1st day of July, 1881.

This grant of authority is made in the full knowledge, on my part, that the said Surgeon-General has no authority under the law to contract for the payment of any sum of money whatever as rent for the occupation of the portion of said building above specified, and that no legal claim for such rent will, or can, accrue to me or my heirs, by virtue of such occupation, against him or against the United States, or any officer or agent thereof; although it is understood by me that assistance will be rendered by the War Department to secure appropriate legislation from Congress at its next session to authorize the formal leasing of the premises for the period specified at a rental of $125 per month.

ROBERT O. HOLTZMAN. [SEAL.]

In presence of—
JNO. WILSON.

47TH CONGRESS, 1st Session. } SENATE. { EX. DOC. No. 3.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING,

In compliance with law, a "report of the condition of the fortifications, and what number of them, if any, can be dispensed with."

DECEMBER 7, 1881.—Referred to the Committee on Appropriations and ordered to be printed.

WAR DEPARTMENT,
Washington City, December 6, 1881.

The Secretary of War, by a provision of the act of March 3, 1881, "making appropriations for fortifications and other works of defense, and for the armament thereof, for the fiscal year ending June 30, 1882, and for other purposes," was directed to make "report of the condition of the fortifications, and what number of them, if any, can be dispensed with."

In compliance with this requirement the Secretary of War has the honor to transmit to the United States Senate a letter of the Chief of Engineers, and the report of the Board of Engineers for Fortifications, referred to therein.

Although the problem of defense of our maritime frontier has been greatly changed since the sites of our fortifications were selected many years ago, mainly by joint boards of Army and Navy officers, the reasons governing their selection in a greater or less degree still exist.

In the late war, although the enemy was not a maritime one, it was found to be necessary, not only to acquire and to fortify new sites within and adjacent to the harbors covered by our works of fortification, but to fortify harbors which had not theretofore been included in our system of defense, and it seems likely that in any future war with a maritime power the list of harbors to be fortified will be still further increased.

Guided by this experience it would seem to be unadvisable to relinquish any of the sites belonging to our present maritime defenses.

ROBERT T. LINCOLN,
Secretary of War.

The PRESIDENT *pro tempore*
of the United States Senate.

OFFICE OF THE CHIEF OF ENGINEERS,
UNITED STATES ARMY,
Washington, D. C., December 5, 1881.

SIR: In compliance with the instructions contained in your letter of the 15th ultimo, calling for a report of the condition of the fortifications and what number of them, if any, can be dispensed with, I have the honor to transmit herewith a report of the Board of Engineers for Fortifications, dated the 30th ultimo.

The views and statements of the Board are concurred in by me.

Very respectfully, your obedient servant,

H. G. WRIGHT,
Chief of Engineers, Brig. and Bvt. Maj. General.

Hon. ROBERT T. LINCOLN,
Secretary of War.

REPORT OF THE BOARD OF ENGINEERS.

OFFICE OF BOARD OF ENGINEERS FOR
FORTIFICATIONS AND FOR RIVER AND
HARBOR IMPROVEMENTS, &C.,
Army Building, New York, November 30, 1881.

GENERAL: Referring to your endorsement of November 16, 1881, upon the letter from War Department of the 15th asking for "report of the condition of the fortifications and what number of them can be dispensed with," &c., this Board has the honor to submit the following reply:

In order that the present condition of the fortifications of the United States maritime coast may be readily and fully comprehended, the following brief exhibit of their history and progressive changes seems necessary:

The first forts planned for sea-coast defense were intended to meet the attack of sailing ships of war, and so far as completed were deemed sufficient for that purpose. A small number of them at especially important localities were designed to resist a siege and were larger than would now be needed, and all of them were intended to be strong enough on the land fronts to ensure their safety against land attack until relieved by our own forces. The sparse population of our country at the date of their inception demanded such strength of *tracé*, for no one at that time could predict our very rapid national development. With the advent of steam as a propelling power for naval ships armed with guns of increased caliber (9 and 11 inch smooth bores), came a necessity for increased power on the side of the shore defenses. This was effected in part by the addition of barbette batteries exterior to those forts whose sites permitted their construction, and in part by the erection of new castellated works with several tiers of guns, like Fort Wadsworth, Staten Island, New York; Fort Constitution at Portsmouth, N. H., and Fort Carroll, on the approaches to Baltimore. There can be no doubt that forts of this character, armed with 8 and 10-inch Rodman guns and aided by channel obstructions, would have proved efficient as against the wooden vessels of their date, as they furnished secure emplacements for so large a number of effective guns as to make their attack a very risky and improbable event. No fleet of wooden ships could take and hold positions near enough to them during the time requisite to injure

their scarps by battering. This system of fortifications, initiated when steam vessels were first introduced into the navies of maritime powers, as developed from that time up to the year 1860 in the United States was beyond cavil the best in the world, and would have proved itself an efficient defense for our sea-coast, but for the great advance in naval warfare, commenced about that date, by giving iron protection to ships and arming them with rifled guns of 9, 10, and 12-inch caliber, throwing elongated projectiles of 250, 400, and 600 pounds weight. Even against this earlier class of iron-clads, had naval progress stopped here, our forts could have made an effective resistance by mounting in their casemates 9, 10, and 12-inch rifles. To effect that end some modifications, especially in the embrasures in the way of iron shields, would have been required. All barbette batteries without great cost per gun could have been changed to admit 12-inch rifles.

The Board of Engineers, organized in 1867 to take up the subject of sea-coast fortifications and to work out plans for their modification to meet the wants of the day, made some trials to test the endurance of the masonry scarp of Fort Delaware with an embrasure shield, both of which resisted very fairly, and they concluded therefrom that were it a question to meet the ships and armaments of that date the existing forts and batteries could be so strengthened and armed as to effect that end. In their full report upon this subject, made in 1869, they predicted the continuous advance which has since been made in ships and their armaments, drawing the inference therefrom that it would be unwise to adopt any system with a view to strengthen our masonry forts to meet the then existing condition of naval warfare, giving it as their opinion that before such modifications could be effected the progress made in ships' armor and in guns might render such changes if not useless, at least, but partially effective. England at that time recognizing the necessity for giving security to its more important harbors, and especially to its naval depots at Portsmouth and elsewhere, devised and commenced for their defense inclosed forts with masonry scarps and with iron shields for protecting the guns, and others with continuous iron scarps.

Our own Board of Engineers did not think it prudent at that state of development of armor and guns to adopt the English method. Rather in obedience to the necessity for some more ready and inexpensive method of giving partial security to our exposed harbors, they recommended the construction of earthen barbette batteries for 12-inch rifled guns wherever they could be developed, with protection to the gunners from enfilade and very oblique fire by high earthen traverses and thick parapets, together with such changes upon the ramparts of existing forts as would admit the 12-inch rifle to be mounted thereon. Recognizing the efficiency of vertical fire against the decks of armored ships—their most vulnerable portions—they farther recommended mortar batteries to aid the direct fire of barbette guns. But in view of the fact that ships of war propelled by steam move rapidly, and might therefore take the risk of running the gauntlet of all the fire the above batteries might bring to bear upon them, their report urged the necessity of channel obstructions, giving the preference for such purpose to a system of submarine mines classed as torpedoes, and advised that the officer in command at Willets Point of the Engineer Battalion should be charged with developing such system. With the foregoing principles and conclusions, approved by the Chief of Engineers and Secretary of War, to guide their action, they devised plans of defense, first for all the more important harbors of the United States sea-coast, and since for those of minor value. Those plans have been but partially executed for the want

of appropriations, as appears from the following report, so that nearly all of our most valuable sea-coast centers of commerce, wealth, manufacturing interests, and navy-yards have but feeble defenses to secure them from a determined attack by sea. And in this connection it may be well to remark that there are no suitable guns to arm those battery emplacements that have actually been prepared, excepting a small number of smooth-bore 15-inch Rodman's and converted 8-inch rifles.

The system of torpedo defense which has been developed and established by the engineer officer in command at Willets Point, with abundant material on hand, and with the aid of a sufficient number of trained experts, could be applied with great success in the channels of approach to harbors, provided suitable arrangements in our existing forts for their service were prepared beforehand; and farther, that a sufficient number of effective guns on shore were mounted to prevent the enemy from destroying them. The arrangements above alluded to in the way of secure casemated electrical operating rooms and of masonry underground galleries to carry the cables below low-water will require much time for their construction, and should therefore be commenced without delay.

Referring to the condition of our sea-coast defenses, as set forth in the report following, we would remark that the batteries designed by the Board of Engineers were intended to be armed with the 25-ton 12-inch rifle. Within a very short period great progress has been made both in guns and projectiles. The English 12-inch gun has been increased in weight up to 43 tons, and with a charge of 285 pounds of powder will throw a projectile of improved form and metal weighing 800 pounds with very great velocity. Though the penetration of this projectile into iron has not yet been determined by trial, it is computed by the established formula that it will pass through a shield of iron 24 inches thick at close range. Of course it is very desirable and a necessity that our barbette batteries should be armed with this or a similar 12-inch gun. Those batteries that have been arrested in their construction by the failure of appropriations therefor, may be adapted to receive this later model of gun where necessary, the 10-inch improved rifle being used in those emplacements now ready. It should be noticed that this advance in the 12-inch gun favors vastly the shore battery as against the ship. In addition to the guns above noticed, 80 and 100-ton guns, using charges of 400 and 500 pounds of powder and projectiles weighing, respectively, 1,700 and 2,000 pounds, have been successfully constructed, and have been mounted in turreted ships of war. England has also sent, or is about to send, four of these largest guns to its forts in the Mediterranean at Malta and Gibraltar. Though ships mounting such guns cannot be numerous, they will doubtless form a part of the future naval power of maritime nations; and shore defenses must be planned with a view to meet their attack.

The question for the shore defense is, however, rather the armor of the ship than its armament. Whatever may be the former, the shore gun must be sufficiently powerful to throw a projectile that will pierce it with certainty at a distance of a mile, and seriously injure it at double that distance. The projectile of the 12-inch gun will not pass through the water-line armor. 24 inches thick and strongly backed with teak, of the casemate of the English "Inflexible," at that distance. In that view it seems probable that the shore battery will require a few 100-ton guns, especially for the defense of cities so important as New York, Philadelphia, and Boston, and that involves the question of iron revolving turrets on shore for their reception and manœuvring. The existence at any point of a few turrets so armed would probably, in connection with a

full development of 12-inch rifles in barbette aided by several torpedo lines, make an attack improbable. The masonry forts now existing are by no means useless. On the contrary, they are very necessary and valuable adjuncts to our harbor defenses. They are keeps to the position, furnish quarters for the garrison that will be required to man the batteries, will cover magazines and storehouses, and furnish casemates for electrical operating rooms, and for repelling with artillery fire naval operations designed to destroy the torpedo lines.

Torpedo lines thus operated are now so effective that no fleet would attempt to ignore their existence and run past the land batteries, trusting to speed as a protection against being hit. Their first operation must be to open a passage by countermining, grappling, or other methods which would be attempted probably under cover of the night or fog by boats or small vessels either without armor or lightly armored. Such work would be too dangerous to justify the use of the larger and more unwieldy ships of war. To meet this preliminary attack the channel must be swept by a heavy fire of grape-shot, case-shot, and shells, for which large rifled guns are not suited, partly because they must be too few in number to maintain the needful rapidity of fire, and partly because their projectiles are not adapted to such work. Moreover, where possible, they would be placed on bluffs, while this service would require guns near the water level to secure the maximum effect. For this duty our existing casemated forts are well suited. Armed even with the 10-inch and 8-inch smooth-bore Rodman guns now in store, and a few small rifles for which the old casemates require no modification, their fire would be both effective and rapid. With enough heavy 12-inch, 80-ton, and 100-ton rifled guns in exterior batteries to keep the great armored ships at a distance, these masonry works have sufficient strength to deal with the smaller assailants operating upon the mines. Indeed, if they were not in existence, one of the pressing necessities of the day would be the construction of some form of battery for small guns to serve this essential object.

A few only of these forts in positions of minor importance, not available by the largest class naval ships, will do good service as against fleets that can be arrayed against them.

The question of arming some of our casemated forts as they stand, and of modifying others to receive large guns, has been under consideration by the Board of Engineers for Fortifications since its organization. Though such modifications may be applied in part to a very few works for which plans have been devised, it is thought that in general it would be better economy to use all available means in pushing forward, at least for some years, the defense by exterior batteries and perhaps the construction of iron revolving turrets at two or three of our most important harbors.

If rifled guns were on hand suitable for use in our best casemated works it would be advisable to mount them there. But in view of the large cost of producing a short 8-inch rifle by conversion from a 10-inch smooth-bore, we are of opinion that expenditures should be directed to providing the more effective 10 and 12-inch rifles needed for our barbette batteries.

To the foregoing preliminary remarks we add the following notice of our sea-coast and lake frontier fortifications, giving briefly their present condition and the purpose for which they were designed and constructed, specifying those that are of doubtful utility and assigning the reasons therefor.

Commencing with the coast of Maine, the first in order is

FORT KNOX,

situated upon the Penobscot River opposite Bucksport, at the narrows 18 miles below Bangor.

This structure is essentially finished in accordance with its original plans. It is a casemated work of excellent masonry. Its exterior barbette batteries, however, are mainly relied upon for the defense of this position against a hostile fleet. These batteries are mostly prepared for 10-inch smooth-bore guns. Modified to receive the most improved models of the recent 9, 10, and 12-inch rifled guns, with the aid of torpedoes they will resist effectually the passage of a hostile squadron, and thus secure the anchorage above for our own vessels that may take refuge there, and protect Bangor. This fort should be retained and be put into condition to accompiish the purpose of its construction as above set forth, but since 9-inch rifled guns and a few 15-inch guns can be mounted in its batteries as they now exist, there is no immediate demand for their modification.

FORT POPHAM

was designed to command the entrance to the Kennebec River, to cover the harbor of refuge for large vessels above, to protect the city of Bath, a place of commercial importance, as well as other cities on the interior waters from predatory incursions by a smaller class of war vessels. Incidentally it will cover the railroad bridges crossing the Kennebec. As built it is a casemated work of excellent masonry, suited, however, to receive nothing larger than the Rodman 10-inch smooth-bore, or the converted 8 or 9-inch rifle. Though fully efficient as against wooden vessels, in its present form it cannot be relied upon to defend the position against the larger class of iron-clads which the river depth will admit, as it could not withstand the continued fire of their guns. It will, however, serve as a keep and be an important aid to the position, the defense of which must be made mainly by exterior barbette batteries, yet to be erected, for the reception of 12-inch rifled guns of the most recent type, throwing projectiles of 800 pounds weight. The position is of sufficient importance to demand the retention of this fort, and its modification to give it the requisite efficiency to close the river entrance, which is very narrow, and therefore readily defended. These modifications are not urgent in view of the greater necessity of more important harbors.

PORTLAND HARBOR, MAINE.

Forts Scammel and Preble are barbette works situated upon the main entrance to this harbor. The former is about half finished, the latter well advanced toward completion, in accordance with revised plans adapting it to receive 12-inch rifles of the old model. The platforms thus far prepared will accommodate the later 10-inch rifle, but larger and stronger platforms must be prepared for the chassis of the most recent 12-inch. Large expenditures will be needed to finish these two works in the most approved manner, so that they may fulfill their part in the defense of the main entrances to Portland Harbor.

Fort Gorges is a casemated work nearer the city, and essentially completed according to its original plans to receive the 10-inch Rodman smooth-bore. The modifications of the barbette for the reception of heavy guns to fire upon the northeast entrance, though well advanced, have not yet been finished.

These three works are in reality an interior line of defense. For an outer line, barbette batteries have been designed and commenced at Portland Head to aid in the defense of the main entrance, and to hold fleets beyond effective bombarding distance of the city of Portland. Other batteries have been planned for Cow Island and the east end of Hog Island, to prevent the entrance of a fleet through Hussey's Sound, and to keep at bay ships that may get through a passage between the islands farther east. These batteries have not yet been commenced. The necessity for the foregoing works to protect Portland Harbor is beyond question.

PORTSMOUTH HARBOR, NEW HAMPSHIRE.

The former defenses of Portsmouth and the Kittery Navy-Yard upon the Piscataqua River consisted of old *Forts McClary* and *Constitution*—the first a simple barbette battery inclosed by stockade, the latter an inclosed masonry work of simple plan, mounting guns in barbette only. Plans to occupy these sites by forts of the model of 20 years ago were made before the most recent changes had been found necessary in sea-coast defenses. The construction of these works was commenced and had made some progress when it was arrested in 1866 and '67. They are not, therefore, at all available for defense. The Board of Engineers later, recognizing the necessity for an outer line, devised barbette batteries to occupy advanced positions at the mouth of the river, viz, one at *Jerry's Point*, on the mainland, and a second on *Gerrish Island*, nearly opposite. The latter battery has made little progress beyond the raising of the parapet and the partial construction of two magazines, while that at Jerry's Point has been nearly completed. These batteries are well placed, and if armed with the more recently improved 12-inch rifles will make a good defense. But Jerry's Point battery can receive no larger gun than the 25-ton 12-inch rifle, or more modern 10-inch. Gerrish Island battery, however, may be so finished as to admit the largest gun needed. The sites of Fort Constitution and Fort McClary should be maintained with a view to occupation as a second or inner line of defense, thus securing the interior anchorage for our ships, excluding the enemy's fleet therefrom, and protecting the navy yard.

BOSTON HARBOR.

Forts Winthrop and *Independence*, with their exterior barbette batteries, about two miles and a half below the city, constitute the inner defensive line of Boston Harbor. The former is a keep to the batteries on Governor's Island, and is completed. The batteries themselves are suited for the reception of the 25-ton 12-inch rifled gun, or for the recent 10-inch. With slight modifications some 12-inch rifles of the latest patterns could be introduced. Fort Independence is a bastioned masonry work with exposed scarp. It is not adapted to large guns. The barbette batteries on the ramparts have been modified for large calibers, and it is probable that 9 and 10-inch rifles of the recent pattern can be mounted there when procured. An exterior battery for rifles of the same caliber is essentially finished.

The outer line of defense consists of an earthen battery on *Long Island Head* to command the Broad Sound entrance, and *Fort Warren* at the Narrows to close the main channel of approach to the harbor and to cover the anchorage of Nantasket Roads.

The modifications of the barbette battery of Fort Warren, as planned

by the Board of Engineers, have been in part effected. When finished, 9 and 10-inch guns of the recent pattern can be mounted on the ramparts. The demilune has also been changed for guns of the same caliber. The importance of this position doubtless demands for its defense guns as large as the more modern 12-inch, and a small number of 100-ton guns mounted in revolving turrets.

The battery at Long Island Head is not very far advanced towards completion, although it is regarded as one of the most important means of defense for the harbor.

All the forts and batteries thus briefly noticed are essential to the defense of Boston and its navy yard, and even other positions should be occupied to make that protection complete. The inner line of defense is in an advanced condition; the outer is quite incomplete.

NEW BEDFORD, MASS.

The casemate work on *Clark's Point*, at the entrance to New Bedford Harbor, is well built of excellent masonry. Although it may receive an 8-inch, and possibly a 9-inch rifle, like all forts designed thirty years ago it is not adapted to guns of sufficient caliber to penetrate the best-protected iron-armored ships of war, nor will its masonry resist much battering by the heaviest guns carried by that class of vessels if permitted to close upon the works. The protection of this position therefore requires the aid of exterior barbette batteries, containing emplacements for guns that can contend successfully with hostile fleets, or otherwise the abandonment of all additional means of defense until the approach of war. New Bedford is a city of wealth, some commercial and manufacturing importance, and has a good inner and outer harbor, in which coastwise traders may take refuge in war if pursued, provided its defense be secured. There can be little doubt that the interests of our coast commerce, and those of the citizens of the place, demand protection for this harbor in the way of efficient barbette batteries suitably armed. Such batteries require much time for their construction. Though the place is of secondary importance, its defense cannot well be delayed until the breaking out of war.

It is not out of place here to remark that there are many cities and harbors along our extended coast, possessing about the relative importance of New Bedford, that would invite attack by small fleets if not protected, their harbors being occupied at the will of the enemy and the corporations laid under contribution. In the original designs for the defense of our maritime frontier all such places were to be provided with suitable fortifications, and the fort at Clark's Point was planned and built with that view, and was fully equal to the requirements of the position at the time.

NARRAGANSETT BAY, RHODE ISLAND.

Fort Adams, devised to cover the deep and commodious harbor near Newport, R. I., in connection with suitable works on Dutch Island, was intended to exclude hostile fleets from the waters of Narragansett Bay, and to reserve them for the use of the naval and commercial marine of the United States. These waters during summer and winter constitute a harbor of refuge for our European and coastwise commerce quite equal in every respect to that of New York Harbor, and are even more accessible. To the earlier Boards of Engineers the security of this grand anchorage was regarded as a necessity. In the carrying out of these

views Fort Adams was built. This work, proportional to the requirements of the infant republic, and planned to endure a long land siege, is much larger than would be built, now that it is not liable to such siege. Its present use is as a keep of the position, a storehouse for ammunition, and a cover for the garrison. The defense must be made by exterior batteries armed with suitable guns. Such batteries are in process of construction. It will hardly be possible, however, to close this entrance to Narragansett Bay without the aid of similar batteries on the opposite shore, which have not as yet been planned.

Dutch Island

is favorably situated in the western entrance to the bayfor closing that passage. Batteries have been devised for the position, some portions of which are well advanced towards completion. The full defense of this entrance will require the construction of all the batteries planned, with some modifications of emplacements for the reception of the large gun now deemed necessary for like positions. The island shouldbe secured against assault by a keep. Eventually the opposite shores will need similar batteries of less extent to perfect the defense of the channel on either side of the island. The closing of Narragansett Bay will also cover the cities of Providence, Bristol, and Fall River, as well as Newport and other smaller places.

NEW LONDON AND HARBOR, CONNECTICUT.

The city is on the river Thames, about two miles from its mouth. The harbor and the river above are deep, constituting an excellent land-locked anchorage. They should be secured as a harbor of refuge, and to the exclusion of an enemy.

Fort Trumbull, a well-built casemated work, now covers the harbor, so far as its armament of small guns can be made available. A small barbette battery to the north of the work, recently completed, will add largely to the defense of the place as against naval attack, as its emplacements will admit the 25-ton 12-inch rifle or the recent model of the 10-inch. The battery to the south of the fort, prepared for a smaller gun, will admit the 8-inch converted rifle. Fort Trumbull could not withstand the attack of the best class of iron-clads, mounting the heaviest guns now carried by ships of war. It will, however, lend aid thereto by its exterior batteries, and will serve as a depot and support for the garrison of the place, and it should be kept in order, and its magazines be made reliable and secure.

Fort Griswold, on Groton Heights, opposite the harbor, is a barbette battery of former type. Plans for the modification of this battery to give suitable emplacements for larger guns have been prepared by the Board of Engineers, but no progress has been made towards carrying them into effect.

The proper defense of New London and its harbor should be made by batteries placed at the mouth of the river, Battery Griswold and Fort Trumbull constituting the inner line. The government, however, possesses no sites for works in that advanced position. This harbor should be made secure for its excellent anchorage, open at all seasons, and to protect the railroad connections which center at this place. It belongs, however, to that class of harbors admitted as of but secondary importance.

NEW HAVEN, CONN.

Fort Hale, on the channel of approach to the harbor of New Haven, is a field work of a temporary character in part, as its traverse magazines

and bomb-proofs were built of wood, and are now essentially decayed. The ditch, however, and the parapets are preserved nearly intact. The position is a good one, and the fort should not, therefore, be abandoned, as guns could be mounted in it, with some little delay for repairs, if needed. Batteries in a more advanced position would better cover this harbor and city.

NEW YORK.

The importance of preventing a hostile fleet from taking possession of this harbor and the cities of New York and Brooklyn, the navy-yard, and the navigable waters of the Hudson, cannot be overestimated. In truth, the approaches by the eastern and southern entrances should be so thoroughly protected as to preclude attack. The State and local interests alone, setting aside those of the country, demand such protection, regardless of the amount of expenditure involved. Failure to successfully defend New York in war would be a calamity to the nation, crippling its resources, and humiliating in the extreme; while its possession would constitute the greatest possible victory an enemy could achieve. The national sacrifice could not be measured by money interests, and the state and city and individual losses would be almost incalculable—many times greater than the cost of suitably fortifying the entire sea-coast of our country.

Fort Schuyler.

This three-tier casemated work was designed, in connection with a large fort at Willets Point on the opposite side of the channel, to close the eastern entrance to New York. The two finished would have constituted an excellent defense for the eastern entrance to the harbor against hostile fleets as constituted 25 years ago—mostly sailing vessels with light armaments—but would be quite inefficient to meet naval attacks at the present time. Plans made by the Board of Engineers for the modification of Fort Schuyler so that it may receive large guns upon its ramparts have been in part carried out, as well as those for exterior batteries, perhaps the more important of the two. The completion of the work thus devised is imperative.

Willets Point.

A large barbette battery for heavy guns, designed to occupy the crest of this height, has been in part completed. It ought to be finished without delay as the readiest means of giving some degree of protection, if not entire security, to this position. The casemated work had made but little progress when its construction was arrested. It is but a small factor in the defenses of Willets Point. It seems probable that the importance of this position will demand the planning of further works, probably turrets for 100-ton guns, to aid in effectually closing the channel between Forts Schuyler and Willets Point. Torpedoes will prove a failure unless the shore batteries are powerful enough to keep hostile ships at a distance.

SOUTHERN ENTRANCE TO NEW YORK.

The most advanced position on this southern approach intended to be occupied is Sandy Hook. The large casemated work devised for this site was commenced in 1857. Though the lower tier of casemates is in part completed, its arrangements require thorough modification to suit

it to modern artillery. Its purpose is to prevent the occupation of lower New York Bay by an enemy's fleet, as also to command the main channel of entrance. It seems probable that a strong work at this point, were the passage at the Narrows thoroughly closed, would preclude vessels from attempting to run the gauntlet of its fire for the object to be attained, viz, an anchorage under the lee of Sandy Hook.

THE NARROWS.

Fort Hamilton, on the east side, with its exterior batteries, and *Forts Wadsworth* and *Tompkins*, opposite on Staten Island, with a long line of barbette batteries, constitute the defense of the Narrows. The three forts are essentially finished, but neither Fort Hamilton nor Wadsworth can mount guns of the caliber now needed. Fort Tompkins will admit large guns upon its ramparts. The defense of this position must be made by the barbette batteries armed with 10 and 12-inch rifles. So important is it to close the Narrows against a hostile fleet, and so fatal would be its passage, that the Board of Engineers regard the construction of iron revolving turrets for eight (8) 100-ton guns, aided by several lines of torpedoes, as essential to secure that end.

The forts and exterior batteries on *Governor's Island* and *Bedloe's Island* constitute the interior line of defense of New York Harbor. Should the Narrows be forced by a fleet, unless it were much crippled, it is probable that this inner line would fail of its purpose. It might, however, be quite effectual as against a single vessel, or even two, or more, should that number run the gauntlet of the forts and torpedo lines below. They have always been regarded as an important part of the defenses of New York. The earthen batteries are the essential features of this line, and if armed with 12-inch rifles of the longest range they could attack approaching ships as soon as they left the range of fire of the forts at the Narrows. In fact there would be no position, except in Kill von Kull, between Fort Wadsworth and Bedloe's Island, that a ship could lie out of the reach of guns of one or the other position. These batteries, however, may be looked upon as of secondary importance compared with those of the advanced positions. But for a harbor so valuable as that of New York, no single line of defense should be relied on. Even all the defenses hitherto projected may be insufficient to secure this city beyond peradventure.

DEFENSES OF PHILADELPHIA AND THE NAVY-YARD AT LEAGUE ISLAND.

Fort Mifflin occupies a good position for commanding the deep channel of the river Delaware, which lies within a half mile of the work. It is a simple barbette fort of very old style. The Board of Engineers has submitted plans for preparing its ramparts and that of the demilune for large guns, and for barbette gun batteries and emplacements for mortars exterior thereto just south of the work.

These have not been finished. Though they constitute the second line of defense of the Delaware, their importance to the safety of Philadelphia and League Island demands their early completion.

The outer line of defense is at Pea Patch Island, and consists of *Fort Delaware*, a casemated work of the design of 30 years ago, and essentially completed, and of barbette gun batteries and emplacements for mortars at *Finn's Point*, on the Jersey shore, and similar batteries near *New Castle* on the Delaware shore.

The work of modifying Fort Delaware to receive large barbette guns

on the bastions has not been finished by reason of the failure of appropriations therefor since 1876. It is very essential that the two water batteries on the shores opposite Fort Delaware should be completed, as little reliance can be placed upon Fort Delaware in its present condition. In fact, though it must serve as the keep of the position and the storehouse for ammunition, &c., the down-stream front, unless very largely thickened and strengthened, could not resist the prolonged battering of ships armed with heavy guns. Such ships could only be kept at a distance and prevented from closing upon the work by guns of great power and long range on the shores opposite the fort.

The further defense of this outer line may involve the question of revolving turrets for 100-ton rifles.

DEFENSES OF BALTIMORE.

Fort McHenry, a barbette battery supported by a scarp, making an inclosed work, constitutes, with its exterior barbette battery, the inner line of defense for this rich city, with its large commerce and manufacturing interests, and is at this time the sole defense at the entrance of the harbor. Its exterior battery is but partly finished. When completed and suitably armed, it will command the approaches for 3 miles seaward. An outer line, however, is needed for the full protection of Baltimore, which by its rapid growth has already extended to the vicinity of Fort McHenry.

Fort Carroll, a casemated work long since designed, yet but in small part built, was intended for the outer defense, aided by a battery on the jutting headland opposite known as Hawkins' Point, for which plans have been prepared by the Board of Engineers. A project to modify Fort Carroll for the reception of guns in casemate protected by iron shields, suited to contend with iron-clad ships, has been made.

As the channel of approach to this work is an artificial one and narrow, and therefore favorable to obstruction, the defenses planned, it is thought, will prove efficient protection to the position. They will require, however, much time in their execution, and should therefore be commenced without delay. In the present condition of the above-described defenses, Baltimore could be protected from attack by sea only by the destruction of its artificial channel.

WASHINGTON, D. C.

Washington, with its navy-yard, is very imperfectly covered by *Fort Foote* and *Fort Washington* on the Potomac. The modification of both of these barbette works in accordance with the designs of the Board of Engineers were long since commenced, but executed only in part before the suspension of appropriations therefor in 1873–'74. In their present conditions, these two works would give but a feeble protection to the capital of the nation and its naval establishment.

HAMPTON ROADS, VIRGINIA.

Fort Monroe, the largest work upon the sea-coast of the United States, was designed to command, in conjunction with Fort Wool, the entrance to Hampton Roads, as well as to cover the cities of Norfolk and Portsmouth, on Elizabeth River, and the navy-yard at Gosport. The Roads are an important anchorage and harbor of refuge for our own commercial marine and war vessels, and should therefore be closed to an enemy's

fleet. The fort is casemated in part, and in part protected by the covered way and outer casemate battery. The modified designs of this work contemplate putting as many large sea and channel bearing guns on the ramparts and in the covered way and advanced battery as they will admit, and the construction of an exterior 10-gun barbette battery, extending the present outer casemate battery the length of the channel fronts, thus covering that portion of the exposed scarp, which is built of poor rubble masonry and too weak to resist large projectiles. But a small portion of the above modifications has been carried out, for lack of appropriations, and the fort is not in condition for the effective defense of this position.

Fort Wool, an inclosed casemated work, lies 1 mile distant from Fort Monroe on the opposite side of the channel. Although commenced in 1818, the preparation of its artificial foundation upon a shoal, with the subsequent settling, delayed the structure so that the first tier of the faces bearing on the sea and channel with the curved ends only have been finished, the gorge showing but little work done. In its present condition it is not available. Plans for its modification have been prepared giving emplacements for 12-inch and 16-inch rifles protected by iron shields. This position may require the aid of revolving iron turrets, which, although long since proposed for land defenses, as against attack from the sea have as yet scarcely been fully adopted. We know of but one, that at Dover, England, suited for the largest-caliber guns and with armor to resist the heaviest projectiles. It seems to be rendered necessary, however, by reason of the more recent improvements in ships and their armaments, to meet which the shore gun should be at least equal to that of the attacking iron-clad, and be more fully protected. It is apparent from the foregoing that the defenses of Hampton Roads, covering important interests on the rivers above, are not sufficiently advanced to be effectual.

BEAUFORT, N. C.

Fort Macon was designed and built many years since to protect the harbor and city of Beaufort against the smaller class of war vessels which could pass the bar.

It is an inclosed masonry work, with counterscarp defense for its ditches. Its fire, however, all in barbette, is limited to its ramparts and covered ways. The city and harbor can be reached by the projectiles of long-range rifled guns on ships outside the bar. The shore defense therefore needs similar guns not only to prevent the smaller class of war vessels from entering the harbor but to keep them distant from the shore. The fort is a very good keep to the position and cover for needed supplies. The place defended is relatively of minor importance, yet its railroad communications give it some value as a shipping port.

DEFENSES OF WILMINGTON, N. C.

The entrance to Cape Fear River was formerly defended by *Fort Caswell*, an inclosed masonry work at its mouth, suitable to the requirements of the day. This work when abandoned by the confederate forces was partially destroyed by blowing down the scarp of the southeast face, with much injury to the contiguous faces. The fort is not in condition for defense or for occupation. Designs were some time since prepared for the construction of exterior barbette batteries to receive 12-inch rifled guns to command the channels at the entrance to the river, but they have not been applied to the position, which is now unprotected. Wil-

mington, the most important port on the coast of North Carolina, and the anchorage near the mouth of the Cape Fear River require protection, and some provision therefor should be entered upon. The defense of the position is not a difficult question, as the bar at the entrance to the river cannot be passed by deep-draught iron-clads.

CHARLESTON, S. C.

Fort Moultrie, on Sullivan's Island, and Fort Sumter, opposite and about a mile distant therefrom, are almost the sole defenses for this city, with its valuable harbor and commerce. The first of these works is but a simple barbette battery with a defensive gorge, and inclosed by a low scarp wall. The preparations made to adapt it to large guns are well advanced.

Fort Sumter was originally a casemated work, well built, but nearly destroyed during its siege in 1864. Eleven casemates intact are now armed with such guns as they are suited to receive. A large portion of the barbette tier, as modified, is ready for the 25-ton rifled cannon. The defenses of this position, though quite insufficient, have been pushed as far as the appropriations would admit.

Fort Johnson, on James Island, if armed with large barbette guns, will add to the protection of Charleston Harbor, and should therefore be preserved.

Castle Pinckney, having become dilapidated, has been turned over to the Light-House Board. It might be prepared on the approach of war for a few heavy guns in barbette, and thus with Fort Johnson constitute an inner line of defense.

If the dikes now under construction are successful in giving 22 feet of water over the bar, additional defenses will be needed for this harbor.

SAVANNAH, GA.

Fort Jackson, on the Savannah River, an old barbette work, with some preparation therefor, can receive five large guns, which would be very effective, as the position the work occupies is a very favorable one. Modifications to effect the above purpose were planned in 1870, but have not progressed sufficiently, for the want of funds, to be of any practical use.

Fort Pulaski, on Cockspur Island, at the mouth of the Savannah River, is a casemated work, and was intended as the principal defense for the city of Savannah. But little progress has been made in carrying out the changes planned to provide emplacements for guns of large caliber to replace the light armament of the original designs. Work done has been principally confined to the demilune. The defenses of this position are not in an advanced state, and therefore quite insufficient.

TYBEE ISLAND, GEORGIA.

Plans have been prepared for a large barbette battery, protected by a keep, to be located on the north shore of this island, for the defense of the anchorage as well as to cover the channel of approach to the mouth of the Savannah River. Although title to the land needed for the above purpose has been acquired, no progress has been made in the construction of the work.

CUMBERLAND SOUND, FLORIDA.

Fort Clinch, on Amelia Island, Florida, constitutes the sole protection to this anchorage and to the harbor and city of Fernandina, a place of some commercial importance in connection with the shipping interests centering there. Nothing has been done to carry out the changes devised to adapt this fort to the reception of large rifled guns needed for the defense of this position.

SAINT AUGUSTINE, FLA.

The old Spanish fort *San Marco*, in this city, being of historical interest, would seem entitled to small expenditures simply to preserve it as a relic of a former time. The existing exterior water battery, armed with 8-inch rifles, will be sufficient to prevent small cruisers from running in to seize the harbor and town. No increase to the defenses seems necessary.

KEY WEST, FLA.,

is a coal depot for our Navy and commercial marine. From its position so near the West India Islands, and on the channel track of a very large commerce, it seems a necessity that the harbor of Key West should be held absolutely, even though at great cost.

Fort Taylor, a well-built masonry fort, was planned and constructed for that purpose in connection with some redoubts to occupy advanced positions on the island, with a view to keep hostile ships distant from the shore and to prevent any party from landing for predatory purposes, and especially an expeditionary force from getting a footing thereon with a view to its seizure and occupancy. Fort Taylor, however, cannot withstand battering by the heavy rifled guns now carried by iron-clads unless its own power is sufficient to force such ships so far distant as to render their fire inaccurate, and therefore but partially effective. The harbor defense must rely in great part upon shore batteries both at the northwest point of the island and at the advanced redoubts, armed with guns of great efficiency. Some changes have been made on the ramparts of Fort Taylor to mount there 10 or 12 inch rifled guns near the tower bastions; but with those changes the work is insecure. Even with the aid of the shore batteries, which, though long since commenced, have only in part been completed, the defense of Key West will be difficult and the question of turrets and 100-ton guns must come up in connection therewith. A maritime enemy must be prevented from seizing Key West and its harbor and existing works.

DRY TORTUGAS, FLORIDA.

The harbor formed by these sand islands was selected by the first Board on Coast Defense as a grand naval depot for the Gulf. It is essentially closed against storm waves, is commodious, and would afford refuge to our naval and commercial marine during war if protected. Its defense contemplated the occupation of these islands by forts and batteries sufficient to exclude an enemy from the harbor.

Fort Jefferson, the principal work of the system, has been built upon Garden Key. Though a large fort it is not suitable for large guns, and has not, therefore, the power requisite to prevent an iron-clad fleet from closing on it and injuring it very seriously, perhaps forcing its surrender. Unless guns of the heaviest caliber can find emplacements on this work

it will be liable to such attack, provided an enemy is willing to throw away its ammunition for the object to be gained. The modifications to adapt its ramparts contiguous to the tower bastions for 12-inch rifled guns have been but partially effected, and the fort may be regarded as defenseless. The question of strengthening this work and preparing it for a suitable armament adapted to the wants of the day and of occupying other sand keys near demands careful study before decision. The problem is difficult, in view of its changed conditions produced by the great progress made in naval warfare during the past twenty years. The requirements of our own naval service, formed of steamships instead of sailing vessels, affect the strategical importance of the question, raising a doubt if the designs of the early Board on Coast Defense, composed of officers of the Navy and of the Engineer Corps, should be carried out in view of the large expenditures they would necessarily demand. There is no necessity for determining this question in haste. More important positions covering vast interests have the first demands upon the country for protection.

PENSACOLA HARBOR AND NAVY-YARD, FLORIDA.

The entrance to this harbor was formerly defended by three works, *Forts Pickens*, *Barrancas*, and *McRee*. The latter, however has become a ruin by reason of encroachments of the sea, and is now worthless. The others, commenced one in 1828, and the other in 1839, are not modern works, and are quite insufficient for the position. Designs were made by the Board of Engineers for mounting large guns on the bastions and on portions of the sea fronts of Fort Pickens, but eight emplacements only were finished before the suspension of appropriations therefor in 1874. Plans for exterior sand batteries for heavy guns were also prepared, which have not been executed. Near the site of Fort McRee positions were selected for similar batteries, which, in connection with those on Santa Rosa Island and on Fort Barrancas, would be very effective, when completed and suitably armed, aided by torpedo lines, to close the entrance to Pensacola, as the larger class of iron-clads cannot pass the outside bar. The above works not having been commenced, there is but little defense as yet provided for this position. Under no circumstances should a place of the importance of Pensacola harbor with its navy-yard be permitted to fall into the possession of an enemy.

MOBILE, ALA.

Fort Morgan, a casemated work at Mobile Point, was completed in 1833. It is well placed to command the entrance to the lower anchorage or outer harbor, but as only eight 200-pounder Parrott guns can be mounted on the ramparts it will be an ineffectual defense until exterior batteries for heavy guns are built. The importance of the position requires the completion of all the works designed.

Fort Gaines, on the east end of Dauphin Island, though too far from the channel for the most effective range of guns, is nevertheless a necessary adjunct to Fort Morgan in closing this entrance way from the sea. Its exterior batteries, when built according to plans approved, will command the lower anchorage.

SHIP ISLAND.

The fort on the west end of this island was intended to command the channel of entrance to the anchorage under its lee. It has been a fa-

vorite design of former Boards of Engineers to protect by suitable works this harbor of refuge between New Orleans and Mobile, and thus incidentally protect the coastwise commerce of Mississippi Sound.

It would doubtless be useful, could it effect the purpose for which it was designed. It is, however, quite insufficient to accomplish that end, even though armed in casemate and in barbette with the most improved rifle guns that could be introduced there. It will prove, like Forts Taylor and Jefferson, incapable of defending itself should a powerful iron-clad fleet find sufficient inducement to expend its ammunition in the contest for its possession. It does not seem judicious, if it could be done, to make the modifications needed to hold this fort against such attack. There is however no necessity for the immediate decision of the question as to what disposition should be made of the fort on Ship Island.

NEW ORLEANS, LA.,

can be approached through Lake Pontchartrain by gunboats to its very suburbs. To prevent attack from that quarter the two passes from the Gulf into the lake known as the Rigolets and Chef Menteur have been closed by small casemate and barbette works, the former by *Fort Pike*, the latter by *Fort Macomb*. Projects for strengthening these works and increasing their efficiency by preparing emplacements for rifle-guns in barbette, though long since submitted by the Board of Engineers, have not been carried out. There can be no doubt as to the necessity of retaining these forts and of putting them in an efficient condition.

Battery Bienvenue, on the bayou of the same name, was intended to prevent boat expeditions from ascending the bayou to the vicinity of New Orleans. This battery, inclosed by a wet ditch and provided with barracks and magazines, was well suited to its purpose, but is now dilapidated. The Board of Engineers, after inspecting the battery, recommended that it be left in its present condition. Should it be necessary during war with a maritime power to hold it by an advanced guard as a vidette station, it could be renovated in a few days so as to be fit for occupancy.

Tower Dupré, at the entrance of Bayou Dupré into Lake Borgne, was intended, like Battery Bienvenue, to prevent boats from ascending the bayou with a view to reach the solid ground in the vicinity of New Orleans. It is in an unserviceable condition, and its exterior battery has been leveled. The entrance to the bayou from Lake Borgne has 4 feet depth of water, so that a large predatory party could ascend the stream if left free to do so, and get upon firm land near the Mississippi River. This Board, however, in its report upon Tower Dupré, recommended that nothing further than some slight repairs of wood-work should be made to the structure, and that otherwise it should be left in its present condition until the breaking out of war, when it could be readily repaired for occupancy as a lookout by an advanced guard, should it be desirable so to do.

DEFENSES OF THE MISSISSIPPI RIVER.

The main attack upon New Orleans must be made by way of the river, which admits vessels of deep draft. There are but two small feeble works, *Forts Jackson* and *Saint Philip*, about 70 miles below the city, constructed long ago to command the river approach to it. Barbette batteries for rifled guns of large caliber designed to aid the defense by the main works are in an incomplete condition. They should be pushed

forward without delay. The defense of New Orleans is a measure of vital importance, and will require the construction of other works than those already planned to insure the safety of this large commercial city.

BARATARIA BAY, LOUISIANA.

Fort Livingston, situated on the west end of Grand Terre Island, is designed to command the entrance to the bay, and to guard the approaches by the several bayous leading up to New Orleans from the Gulf in this southwest direction. It is not probable that this work would be demanded at this present day, in view of the fact that New Orleans has increased vastly in population, and has in addition ready communication by steamboat and railway with the Southern and Western States, from which it could derive all the aid required to resist land attack in any direction. The fort, however, commands the entrance to the anchorage of the bay, which is available for vessels of light draft, and therefore useful for the coasting trade of Texas. It should be kept in order, and armed with rifled guns in barbette to prevent hostile gunboats from taking possession of the harbor.

GALVESTON HARBOR, TEXAS.

Though plans of batteries have been devised to cover the entrance to this harbor, no appropriations have been made therefor.

PACIFIC COAST.

SAN DIEGO, CAL.

An earthen work at Ballast Point, to command the entrance to this harbor, was commenced under an appropriation made in 1873. No further funds having since been made available for continuing its construction, the batteries have not reached a condition to be occupied by guns, and in consequence there is no defense for this postion.

DEFENSES OF SAN FRANCISCO, CAL., INCLUDING THE NAVY-YARD AT MARE ISLAND, AND BENICIA ARSENAL.

The Golden Gate, at the entrance to San Francisco Harbor, lies between Fort Point on the south, and Lime Point on the north, and is about a mile wide. One casemated fort has been finished on the south side, and a long line of batteries on the hill crest partially completed. On these batteries reliance must be placed to defend the entrance, and they should be finished at as early a day as possible.

Lime Point.

Batteries have been designed to occupy its crest, also Gravelly Beach near by, Point Cavallo and Point Diablo, upon some of which good progress has been made. The question of occupying the base of Lime Point Hill, when a site shall have been prepared by blasting, by a casemated fort with iron shields, by an iron fort, or by turrets has not been fully determined. The contiguous batteries, however, should be pushed to completion as the defense of the entrance way must depend upon them for many years.

The *Second line* of defense consists of a battery on Point San José

within the city limits, extensive batteries on Alcatraz Island, and some smaller batteries constructed during the late war, on Angel Island. As it is impossible to close the Golden Gate securely by the batteries of the outer line of defense for several reasons, the most prominent of which is that the great channel depth precludes the application of torpedo lines between, to aid them, the *Inner line* becomes so much the more necessary, as without it the passage of the first would expose not only San Francisco but all valuable places on the bay and river Sacramento.

Doubtless the most important position on this second line is Alcatraz Island, and the construction of its batteries has received the earliest attention and aid from appropriations. These batteries can deliver a fire that will reach to the Golden Gate as well as cover both channels to the city. It will cross its fire, therefore, very effectively with that of the outer line, and with that of the batteries on Point San José and Angel Island. The completion of its defenses now but partially built cannot be urged too strongly.

Point San José

is within the city limits, and about $1\frac{3}{8}$ miles distant from Alcatraz Island. Its old batteries are ineffective. Plans have been prepared to modify them for the reception of heavy guns, but they have not been carried out. The position is an important one on the *Inner line* of defense of the harbor.

Angel Island.

The channel between Angel and Alcatraz Islands, $1\frac{3}{4}$ miles wide, cannot be covered efficiently without the co-operation of strong batteries at both positions. The old batteries on Angel Island were built for a temporary purpose, and are now practically unserviceable. New emplacements for suitable guns are needed both on the south and west shores of the island; the latter especially to command Raccoon Straits, the channel leading to San Pablo Bay, Mare Island navy-yard, Benicia arsenal, and to the mouth of Sacramento River. In connection with this *inner line* of defense, torpedoes will be required to give efficiency to the batteries, and the more so that their application on the outer line is impracticable.

San Francisco Harbor is perhaps second in importance only to that of New York.

COLUMBIA RIVER.

The defenses at the mouth of this river having been built rapidly and for a special purpose, are of a temporary kind—field works in design—with platforms, magazines, and breast-height of wood, mostly decayed. They are of little use in their present condition. The sites, however, should be retained for future works, to cover the anchorage under the lee of Cape Disappointment.

LAKE FRONTIER.

The defenses for the Lake frontier, so far as constructed, have been applied only to certain places on Lakes Ontario and Erie, to the Detroit River, and to the outlet of Lake Champlain.

All of these, with the exception of the last named, were constructed of the simplest form, sufficient merely to resist a sudden assault, and

armed only with a barbette tier of guns to meet attacks from a naval force.

Naval supremacy has always been regarded as a necessity for protection to our commerce on these waters and to the large cities contiguous to the shores, such as Chicago, Milwaukee, Cleveland, Erie, Buffalo, Oswego, and others.

There are peculiar circumstances affecting the relative chances of England and the United States acquiring at the outbreak of hostilities a naval supremacy upon the lakes.

By treaty stipulations, both powers are equally enjoined during peace against keeping afloat more than a trifling number of guns; but in other respects the advantage would be largely in favor of England, for, while the United States at the commencement of a war would require time to build and launch a fleet upon these waters, the former power might be enabled to send gunboats previously prepared into Lake Ontario by the Saint Lawrence canals, and thence into Lake Erie by the Welland Canal. By these means the United States might be anticipated, and its commerce on the lakes paralyzed or destroyed, and its cities laid under contribution. In this view it is well to note that the Canadian authorities have been for a long period past and are still engaged in enlarging and deepening the canal systems which surmount the Saint Lawrence rapids and connect Lakes Ontario and Erie. To prevent the use of these canals for hostile purposes it would be necessary to block the passage of the Saint Lawrence by heavy batteries, as also to seize and hold the Welland Canal, or else destroy locks so as to render the canals unserviceable.

The questions to consider are whether at the breaking out of war the United States would be in condition to effect these desirable results, or whether unavoidable delays would not prevent their accomplishment until the English Government had sent into the lakes a sufficient number of disposable vessels suited for the purpose.

The military possibilities first stated, taken in connection with the treaty prohibition against preparing a navy in time of peace upon these waters, were the ruling motives for the project and construction of land defenses on our lake coast, and so long as these possibilities exist, works already constructed that fulfill their purpose ought to be retained.

Fort Ontario, Oswego, N. Y.

This work, commenced in 1839, is situated at the mouth of the Oswego River, on its east bank, and on the south shore of Lake Ontario. It is a bastioned work of pentagonal form, with one front facing the lake, one facing the river, and three land fronts. The scarp walls, originally of wood, have been replaced in part by constructions in masonry, the design being to limit their height to 15 feet above the ditch, and to cover them from artillery fire by earthworks. The scarp walls of certain of the flanks have as yet been raised not more than 4 or 5 feet above the ditch. The work is therefore unfinished and not secure against a *coup de main*.

It cannot secure Oswego against bombardment from the lake or from the land. It is now quite surrounded by the city, except on the lake side, and its offensive action against a hostile fleet would be confined to the artillery of its water fronts. And further, Oswego, situated on a nearly straight line of the lake shore, cannot be made secure against the fire of hostile ships by a further development of batteries along that shore, though additional batteries improvised after hostilities have commenced would probably deter a small naval force from an attempted

bombardment of the city and shipping. Our naval supremacy, or at least equality, on the lake can alone save such cities as Oswego (which have no advanced sites for covering forts) from large naval attacks. As against attacks in force from the lake, or from the land, the fort, therefore, would not suffice to protect the city, but against a small improvised naval force the fort, with a proper armament, would probably defeat an attempt to burn the shipping. As a nucleus for a local force to prevent raids by land upon the city, the fort would also prove a valuable auxiliary.

If this fort were not in existence we should not at the present time recommend its construction; if it were complete it would be well to retain it for such security as it would afford. In its present condition what to do with it is doubtful; perhaps the best solution would be to leave it as it is, particularly as it could be made proof against escalade in a short time by temporary constructions.

Fort Niagara.

This work, commenced in 1839, is situated on the east bank of the Niagara River, at its outlet into Lake Ontario. It would be principally useful in prohibiting to an enemy the use of the lower part of the river as a harbor, and if upon the advent of war the opposite (Canadian) bank were seized and secured it would cover this harbor for the use of our vessels. The construction of earthen parapets on the river and lake fronts and of parados against reverse fires will be essential to the efficiency of this fort. Some protection should also be given to the magazines. But all work, except what may be necessary for preservation, may be left to the demand of future exigencies.

There seems to be no reason why this fort, which may be of utility and is certainly is the way of no one, should at the present time be dismantled and abandoned.

Fort Porter, Buffalo, N. Y., commenced in 1842, is situated on the Niagara River, and consists of a square stone tower, or keep, in ruins, surrounded by a square barbette battery.

By joint resolution of Congress, permission was given to the city of Buffalo, through its park commissioner, "to improve and beautify the grounds known as Fort Porter, * * * in connection with a public park to be laid out on land adjoining the said grounds" * * *.

The title of the land remains in the United States and a portion of the grounds are occupied for military purposes. The fort itself is of no use.

Fort Wayne, Mich.

This work is situated on the west bank of the Detroit River, within the limits of the city of Detroit, and commands the passage of the river. It is a square bastioned work, commenced in 1841, with a brick and concrete scarp replacing the original timbered scarp. Unfinished water batteries lie above and below the fort.

The city of Detroit is exposed to bombardment from the opposite (Canada) bank of the river, which in this view, as also to secure the Detroit River to our own vessels, it would be a necessity to seize and hold after hostilities have commenced.

The fort may be effectual in preventing the passage of the river in the event of a naval supremacy on the part of the enemy, and under all circumstances would be valuable as a station for a local force to defend the city against limited attacks.

For these reasons the Board at the present time do not think it expedient to dispense with this fort, though with the exception perhaps of small repairs for its preservation it may be left in its present condition until the emergency shall arise for its use.

Fort Montgomery, Rouse's Point, N. Y.

This casemated work, situated at the outlet of Lake Champlain, was commenced in 1841, and is essentially finished.

The Board of Engineers for Fortifications, December, 1870, recommended the substitution of brick arches for the decaying wooden floors in some of the gun casemates, and also that it be kept in suitable condition as a depot for stores and ammunition for troops either moving to invade Canada, or for the defense of this frontier line. They also recommended additional thickness to be given to the exposed magazine walls. The modification of the barbette battery was intended to be delayed until some demonstrations were made by the Canadian authorities to deepen the Chambly Canal.

In its present condition, if armed with suitable guns, the fort would doubtless be efficient in preventing the passage up the lake of hostile gunboats. This, however, is not the sole function the fort may be called upon to perform. For an invasion of Canada on this line of operations it would at once be a fortified base and storehouse for the invading army.

For the reasons above given this fort should be retained and be kept in a state of efficiency.

SUMMARY.

It must be apparent from the foregoing brief sketch of the fortifications of the Atlantic, Gulf, and Pacific coasts, and the Lake frontier of the United States, that the defenses designed for their protection in their present unfinished condition are altogether insufficient for the security of our important harbors, the centers of commerce, manufactures, and wealth; of many minor harbors, which nevertheless have large interests at stake; of roadsteads useful as a refuge for our commercial and naval marine, and of our navy-yards.

It has been fully set forth that the masonry forts devised and in many instances finished in accordance with a system of defense acknowledged to be the best of its period, though still very useful in many ways, are quite unsuited to cope with iron-clad fleets as now constituted with their improved armaments; that the forts are deficient in strength of scarp walls to give security to guns mounted in their casemates wherever the depth of water is great enough to permit the largest class war ships to approach within battering distance, and that the casemates themselves are not sufficiently capacious to admit guns of the large caliber required to keep such fleets at a distance. The efforts of the Board of Engineers and the Chief of the Corps during the past ten years to meet, at least in part, by a readily applied system of barbette and mortar batteries and submarine mines, the immediate necessity for increased means of defense for our harbors has been explained, and the cause of delay (the want of appropriations) assigned therefor. The necessity for completing those batteries to receive the most powerful 10 and 12 inch rifled cannon of the present day, and for making all necessary arrangements in the way of casemated electric operating rooms in the forts, and masonry arched galleries for connecting them with the submarine cables below the low-water line, and for trained experts to lay down torpedoes and attend to their service, has been set forth.

By reason of the more recent and wonderful progress made in the caliber of guns and projectiles and the increase of powder-charges by which great velocities of flight and largely increased penetration into iron shields has been attained, and also the remarkable development in the way of armor protection to war vessels—doubled at least within the past ten years—this Board has felt called upon to set forth the probable necessity for the use of iron revolving turrets as an essential aid in the defense of the more important harbors of the United States. Thick enough to be impervious to the largest gun afloat—the 100-ton gun susceptible of being maneuvered by steam power—they should be armed with the same powerful gun, the projectiles of which will pierce the sides of any ship yet constructed, and fatally injure its turrets at a distance of 2 miles at least. The existence of such turrets, aided by earthen barbette and mortar batteries as devised, and multiplied lines of torpedoes, would render the attack of our most valuable harbors improbable. Only one turret for land defense of above description that we are aware of has been commenced, and that at Dover, England. So well aware is that nation of the necessity for large guns in shore defenses that it is about sending two 80-ton and two 100-ton rifled cannon to Malta and Gibraltar, points that cannot compare in importance with New York, Philadelphia, San Fancisco, and New Orleans.

As to arming our casemated works as they are, or modifying them to receive larger guns than they can now admit, this Board would say that the great cost of providing 8 and 9 inch rifled guns for the best class of these forts would scarcely be justified in view of their very general exposure to attack by the heaviest class of iron-clads, and also pressing need for a larger rifled gun for exterior batteries finished, or now under construction. The Board of Engineers has considered the question of modifying a small number of our best casemated works to admit large guns suitable to the defense of their positions; but it seems probable that appropriations can be more judiciously applied to constructing turrets where needed than to the modification of these forts. At any rate, the casemated works must be armed with a large number of 8 and 10 inch smooth-bores, as is fully set forth in the preceding report, to protect the torpedo lines of defense, quite as important as the fort itself.

In reviewing our coast defenses the Board do not find that any of the works constructed on the Atlantic coast should be dismantled and abandoned as useless. The construction of some of the minor works, it is true, may be delayed, preference being given to the protection of more important harbors.

GULF COAST.

Key West, on the Gulf of Mexico, should be secured, however difficult the problem, if only to prevent its being seized by an enemy with whom we may be at war. The necessity for this will be the greater if the harbor at Tortugas should be left in its present condition.

The Dry Tortugas, 60 miles distant from Key West, consisting of several sand reefs, inclosing a grand anchorage, was designed by the earliest Board of Navy and Engineer Officers to be strongly fortified, in order to secure the harbor beyond peradventure as a great naval depot and refuge for our war and merchant marine. In view of the very large expenditures needed to effect that purpose at the present day, it is a question whether or not the original scheme should be carried out. The decision of this question demands careful consideration. There is no necessity for hasty action.

Ship Island Fort cannot effect the purpose for which it was built, viz,

to cover the harbor of refuge under the lee of the island, and afford protection to the commerce of Mississippi Sound, for the reason that it cannot resist the attack of an iron-clad fleet, which can readily approach it through the deep waters of the Gulf. The object to be gained, viz, to secure a harbor of refuge behind the island, is insufficient to justify the cost of making this position impregnable.

Battery Bienvenue, Tower Depré, and Fort Livingston, at Barataria Bay, are not now necessary for the security of New Orleans against land attack. This city now has a large population, and is easy of access from the neighboring populous States, from which it could derive all the assistance needed in war, if threatened. The above works, however, may be found useful as lookout stations, and should not, therefore, be entirely abandoned and sold. Though it would not at this time be thought advisable to build a fort on Barataria Bay to secure its waters as a harbor of refuge for small vessels of 7-feet draught engaged in the commerce of the coast, Fort Livingston will nevertheless be useful for that purpose, and should, therefore, be kept in order and so armed with rifled guns as to be efficient.

LAKE FRONTIER.

There can be no doubt that Fort Montgomery, at Rouse's Point, and Fort Wayne, near Detroit, should be retained, for reasons set forth in the preceding report.

Fort Porter, at Buffalo, a simple barbette battery, formerly protected by a masonry keep, now in ruins, is of no utility for the defense of Buffalo, either against attack from Lake Erie or by land. The provision at this place for the accommodation of a garrison will probably cause the retention of the site as a military station.

Fort Niagara, at the mouth of the Niagara River, should be retained, as it may be of use in war involving Canada in the way of holding the waters of the river for the use of our shipping. It ought to be kept in order, and on the approach of war be so strengthened and armed as to be available for its purpose.

The case of Fort Ontario involves considerable doubt as to the best disposition to be made of it. While the Board are not yet prepared to recommend its abandonment, the small resources which its position affords for offense or defense will justify leaving this fort in its present state until the lapse of time shall have more clearly determined the question of its utility.

Respectfully submitted.

Z. B. TOWER,
Colonel of Engineers, and Brevet Major-General.
JOHN NEWTON,
Colonel of Engineers, and Brevet Major-General.
HENRY L. ABBOT,
Lieutenant-Colonel of Engineers, and Brevet Brigadier-General.

Brig. Gen. H. G. WRIGHT,
Chief of Engineers, U. S. A., Washington, D. C.

47TH CONGRESS, 1st Session. } SENATE. { EX. DOC. No. 4.

ANNUAL REPORT

OF THE

ATTORNEY-GENERAL

OF THE

UNITED STATES

FOR

THE YEAR 1881.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1881.

LETTER

FROM

THE ACTING ATTORNEY-GENERAL,

TRANSMITTING,

In compliance with law, the annual report of the Attorney-General for the year 1881.

DECEMBER 7, 1881.—Referred to the Committee on the Judiciary and ordered to be printed.

DEPARTMENT OF JUSTICE,
Washington, December 5, 1881.

SIR: I have the honor to transmit herewith the annual report of the Attorney-General for the year 1881.

Very respectfully, your obedient servant,

S. F. PHILLIPS,
Acting Attorney-General.

The PRESIDENT *of the Senate.*

REPORT

OF

THE ACTING ATTORNEY-GENERAL.

DEPARTMENT OF JUSTICE,
Washington, D. C., December 5, 1881.

To the Senate and House of Representatives of the United States in Congress assembled:

In obedience to official duty, I submit the following report of the business transacted by the Department of Justice during the preceding fiscal year, including statistics of crime against the United States, a statement of the appropriations controlled by the Attorney-General, and such other matters as seem proper for the attention of your honorable body.

SUPREME COURT OF THE UNITED STATES.

The condition of the docket of the Supreme Court at the end of the last term (October term, 1880), when compared with its condition at the end of the preceding term (October term, 1879), exhibits an increase in the number of causes remaining undisposed of. At the end of the preceding term the number of causes left on the docket was 795, including 4 original causes; and the number of new causes docketed at the last term was 417, including 6 original causes; making a total of 1,212 causes appearing on the docket during the latter term, 10 of which were original causes. Of these 1,212 causes, the number disposed of and stricken from the docket during the last term was 369, leaving 843 on the docket at the end of that term, an increase of 48 over the number left thereon at the end of the preceding term.

The number of causes actually brought under consideration of the court during the last term was 277, of which 184 were orally argued before the court and 93 submitted on printed arguments. Of the above-mentioned 369 causes disposed of during the same term, judgments (below) in 197 were affirmed and in 48 reversed, 62 were settled and dismissed by parties, 3 dismissed in vacation under twenty-eighth rule, 28 docketed and dismissed, 30 (including 4 original causes) otherwise dismissed, and in 1 questions (certified on division in opinion between judges in court below) were answered.

The number of causes decided at the last term in which the United States were concerned was 41, of which the decisions in 21 were favorable to, and the remainder against, the United States. Of those which were appealed by the United States, the judgments (below) in 16 were affirmed and in 3 reversed; while of those which were appealed by other

(adverse) parties, the judgments in 18 were affirmed and in 4 reversed. Fifteen of the causes were appeals from the Court of Claims, in 14 of which judgment was affirmed and in 1 reversed. Besides the causes decided, there were 11 causes in which the United States were concerned dismissed by the court, 9 of them at the instance of the government and 2 at the instance of other parties; also, 2 causes were docketed and dismissed on motion of the Attorney-General. Thus, the total number of causes disposed of during the last term in which the United States were interested is 54.

Among the causes determined at the last term are some in which the decisions of the court, besides being important to litigants, are more than ordinarily valuable as expositions of commercial law and also of public law. In connection with the latter may be mentioned those given in the cases of United States *vs.* Schurz, and Springer *vs.* United States, reported in 102 U. S. Rep., and Kilbourn *vs.* Thompson, United States *vs.* Blake, and Neal *vs.* Delaware, reported in 103 U. S. Rep. But no particular statement of the subject-matter or conclusions of these cases is demanded in this connection.

INTERMEDIATE COURT OF ERRORS.

I have no doubt that the urgency for some additional provision for the business of the Supreme Court is fully recognized by your honorable body. I will therefore only call attention to the recommendations upon that subject contained in the reports of the Attorney-General for the years 1878, 1879, and 1880.

ADDITIONAL JUDGES.

Your attention is respectfully called to the recommendation for additional judges contained in the last annual report.

COURT OF CLAIMS.

Under the provisions of the act of June 16, 1880, 342 suits, claiming in the aggregate upwards of $7,000,000, have been filed against the District of Columbia. Except a small number, which are apparently not within the jurisdiction granted, they may be classified as follows:

1. *Claims arising out of contracts of the board of public works, and extensions thereof by the Commissioners of the District.*—Two hundred and seventy-one suits, claiming $6,628,782.30.

Of the amounts so claimed, $3,689,716.10 is sought to be recovered as the difference between the amount of indebtedness expressed in certificates of the auditor of the board of public works and other like evidences of debt issued by the board and the amount realized therefor when sold by the contractors in the market.

The residue of nearly $3,000,000 is claimed as for balances due and for damages, in the proportion of about four-fifths for the former and one-fifth for the latter.

2. *Certificates of the auditor of the board of public works.*—Twenty suits, claiming $240,322.34.

3. *Certificates issued by the auditor and comptroller of the District.*—Two suits, claiming $2,885.36.

4. *Contracts made by the levy court.*—Three suits, claiming $2,900.

5. *Sewer certificates, sewer taxes.*—Twenty-two suits, claiming $71,335.20 and interest.

Under the ordinary jurisdiction of the court have been brought since the last report 405 suits, claiming $17,705,717.80. Among these is the claim of the Choctaw Nation, under a special act of Congress, amounting to $15,794,873.87.

The following is a summary of the business of the last term:

CLAIMS AGAINST THE UNITED STATES.

Of suits for proceeds of captured and abandoned property, 9, claiming in the aggregate $1,008,660, were brought to trial. In 8 of these, claiming $952,410, judgment was for defendants; and in 1, claiming $56,250, judgment for claimant for $2,698.94. Nine suits, claiming $503,055.40, were dismissed for want of prosecution.

Of this class, but 9 suits, claiming $2,572,080, remain, which it is expected will be disposed of at the next term.

Of other suits, 114, claiming $4,261,310.26, were brought to trial. In 48 of them, claiming $2,344,707.74, judgment was for the defendants; and in one of these the defendants recovered $372,576.91 on counter claim. In 60 suits, claiming $1,916,602.52, judgment was for claimants for the aggregate amount of $853,131.44.

One hundred suits, claiming $1,683,241.71, were dismissed on motion under the rules or by consent.

CLAIMS AGAINST THE DISTRICT OF COLUMBIA.

Of these, 21 suits, claiming $86,274.93, were brought to trial. In 20 of them, claiming $79,704.31 (18 of which were upon sewer certificates), judgment was for claimants for $46,902.74. In one, claiming $6,534.62 on auditor's certificates and representing nearly all the suits of that class, judgment was for the defendant. Four suits, claiming $61,914.68, were dismissed.

Whole number of cases disposed of	257
Amount claimed	$7,604,456 98
For defendants, 170 cases, claiming	5,551,864 15
For claimants, 87 cases, claiming	2,052,592 83
Amount recovered by claimants therein	902,733 12
Amount recovered by United States on counter claim	372,576 91

The tabular statement presented with previous reports is annexed with additions to date (Exhibit E). It does not include the statistics of suits against the District of Columbia.

CIRCUIT AND DISTRICT COURTS OF THE UNITED STATES.

Exhibits A, B, C, and D show the business of the circuit and district courts of the United States in the several judicial districts during the last fiscal year, as reported by the district attorneys.

Exhibit A is a statement of the civil suits to which the United States was a party, terminated in the circuit and district courts of the United States during the fiscal year ending June 30, 1881, and of such suits pending in said courts July 1, 1881.

During the last fiscal year 2,482 civil suits were terminated; in 1,055 of these judgments were for the United States, in 222 for the defendants, and 1,205 were either dismissed or discontinued; 13 were appealed from the district to the circuit court and 15 from the circuit to the Supreme Court. Many of the civil suits reported dismissed or discontinued were settled by authority of the Treasury Department and discontinued under

its direction. There were pending July 1, 1881, 2,929 civil suits to which the United States was a party.

Exhibit B is a statement of the criminal prosecutions terminated in the circuit and district courts of the United States during the last fiscal year and of such prosecutions pending July 1, 1881.

There were terminated during the last year 11,448 criminal prosecutions; 179 of these were prosecutions under the customs laws, in which there were 91 convictions, 40 acquittals, and 48 were entered *nol. pros.*, discontinued, or quashed; 5,703 under the internal revenue laws, in which there were 3,017 convictions, 678 acquittals, and 2,008 were entered *nol. pros.*, discontinued, or quashed; 363 under post-office laws, in which there were 222 convictions, 50 acquittals, and 91 were entered *nol. pros.*, discontinued, or quashed; 342 under election laws, in which there were 166 convictions, 48 acquittals, and 128 were entered *nol. pros.*, discontinued, or quashed; 95 under the civil rights acts, all of which were entered *nol. pros.*, discontinued, or quashed; 20 under naturalization laws, in which there were 4 convictions, 7 acquittals, and 9 were entered *nol. pros.*, discontinued, or quashed; 277 under intercourse laws, in which there were 216 convictions, 9 acquittals, and 52 were entered *nol. pros.*, discontinued, or quashed; 135 under pension laws, in which there were 80 convictions, 25 acquittals, and 30 were entered *nol. pros.*, discontinued, or quashed; 47 for embezzlement, in which there were 15 convictions, 3 acquittals, and 29 were entered *nol. pros.*, discontinued, or quashed; 4,287 were miscellaneous prosecutions, in which there were 2,907 convictions, 914 acquittals, and 466 were entered *nol. pros.*, discontinued, or quashed.

In many of the prosecutions under the internal revenue laws entered *nol. pros.*, discontinued, or quashed, a compromise and settlement was made in the Internal Revenue Bureau of the Treasury Department.

There were pending July 1, 1881, 6,211 criminal prosecutions, viz, 308 for violations of customs laws, 3,104 for violations of internal revenue laws, 276 for violations of post-office laws, 355 for prosecutions under the election laws, 158 for violations of the civil rights acts, 63 under naturalization laws, 33 under intercourse laws, 88 under pension laws, 77 for embezzlement, and 1,749 miscellaneous prosecutions.

Exhibit C shows the amounts arising from civil suits, to which the United States was a party, and from criminal prosecutions in the circuit and district courts of the United States during the last fiscal year.

The aggregate amount of judgments rendered in favor of the United States in civil suits during the last year was $1,233,244.73½, and the amount actually collected last year on these judgments was $135,362.34, while $70,040.12 was obtained during the year on judgments rendered in former years for the United States, and $139,968.96 was otherwise realized in civil suits.

The aggregate amount of fines, forfeitures, and penalties imposed during the year in criminal prosecutions was $314,735.37, and the amount of these fines, forfeitures, and penalties collected during the year was $62,559.38, while $11,358.85 was realized on fines, forfeitures, and penalties imposed in former years.

Exhibit D is a statement of the civil suits to which the United States was not a party commenced and terminated in the circuit and district courts of the United States during the last fiscal year and of such suits pending July 1, 1881.

Nine thousand seven hundred and seven such suits were commenced during the year, of which 2,584 were cases in admiralty, and 7,143 were other miscellaneous suits.

Seven thousand six hundred and three suits of this kind were terminated last year, of which 1,618 were cases in admiralty, and 5,985 were other miscellaneous suits.

Judgments for plaintiffs in these cases were as follows: 792 in admiralty, amounting to $2,291,293.54; 2,573 in other suits, amounting to $27,657,695.53. Judgments for defendants were 317 in admiralty, amounting to $13,173.38, and 2,172 in other suits, amounting to $82,066.26; 85 cases in admiralty were either dismissed or discontinued, as were also 272 other suits, while the disposition of 424 cases in admiralty and 968 other suits reported terminated during the year is not stated.

Twenty-four thousand three hundred and seventy-one civil suits to which the United States was not a party were pending in the circuit and district courts of the United States July 1, 1881, viz, 2,926 in admiralty and 21,445 other miscellaneous suits.

Exhibit F is a general statement of appropriations placed under the Department of Justice, from which payments have been made during the fiscal year ending June 30, 1881.

Exhibit G is a statement showing items, amounts, cause of expenditure, and persons paid from the contingent fund for the fiscal year ending June 30, 1881.

Exhibit H is the report of the librarian of the receipt and distribution of the Statutes of the United States and reports of the Supreme Court.

Exhibit J is the report of the Architect of the Capitol of the improvements and repairs to the court-house in the city of Washington during the last fiscal year.

Exhibits K, L, M, N, and O show the expenses of the United States courts for the fiscal years ending with the 30th of June, 1878, 1879, 1880 and 1881, paid out during the fiscal year ending with 30th of June, 1881.

Exhibits K and L show in detail what sums were disbursed during the last fiscal year for each judicial district, out of the appropriation for the year 1878 and prior years, for the year 1878 proper and the year 1879, to United States marshals, to the district attorneys, to the clerks of the circuit and district courts of the United States, to United States commissioners, for the rent of rooms and the purchase of the necessary furniture required for holding the courts and for miscellaneous expenses. Thus the fact is apparent that a portion of the actual indebtment incurred in any fiscal year is, for various causes, unsettled till a subsequent fiscal year, the character of which can be understood by an examination of the exhibits mentioned.

For expenses incurred in 1878 and prior years there were paid during the last fiscal year the following amounts: to—

United States marshals	$4,369 52
Attorneys	700 00
Clerks	130 64
Commissioners	3,474 45
Rents	800 00
Miscellaneous	1,830 67

being $11,305.28, out of the appropriation made in the several judicial districts, as will be seen by reference to Exhibit K.

For expenses incurred in 1878 proper, there were paid during the last fiscal year the following amounts: to—

United States marshals	$25,502 87
Attorney	1,242 00
Clerks	14 73
Commissioners	591 79
Rents	550 00
Miscellaneous	1,528 10

being $29,429.49, which will be seen by reference to Exhibit L.

For expenses incurred in 1879 there were paid during the last fiscal year the following sums: to—

United States marshals	$116,488 17
Attorneys	34,595 62
Clerks	54,812 88
Rents	17,533 53
Commissioners	46,167 33
Miscellaneous	34,984 46
Total	304,581 99

which will be seen by reference to Exhibit M.

For expenses incurred in 1880, there were paid during the last fiscal year, the following sums: to—

United States marshals	$273,457 10
Attorneys	57,058 26
Clerks	49,295 44
Jurors	18,637 41
Witnesses	35,257 24
Prisoners	103,948 16
Commissioners	49,459 46
Rents	21,649 55
Miscellaneous	31,958 48

being a total of $640,721.10, which will be seen by reference to Exhibit N.

Of the expenses incurred during the fiscal year ending June 30, 1881, the following sums were paid to—

United States marshals	$610,731 21
Attorneys	262,769 79
Clerks	131,930 58
Jurors	442,097 10
Witnesses	580,748 58
Prisoners	271,132 90
Rents	37,555 46
Commissioners	112,570 63
Miscellaneous	268,650 22

being a total of $2,718,186.47, which will be seen by reference to Exhibit O.

The last two exhibits conform in the details of expenses to each special appropriation as indicated.

This method of a specific appropriation for each general expense of the courts enables the department to check expenses to some degree by knowing for what division of expenses an advance of money is requested by the marshal.

UNITED STATES MARSHALS.

The appropriation for fees of marshals for 1881 was $660,000. Of this sum there was disbursed $610,731.21, being the amount advanced to them, or paid on adjusted accounts prior to July 1, 1881, for their fees and expenses of serving process and for transporting convicts to penitentiaries designated by the Attorney-General under authority given by Revised Statutes, section 5546.

To enable the Attorney-General properly to investigate the accounts of district attorneys, marshals, clerks, and other officials, I submit that the appropriation now applicable thereto should be increased, in order that examinations may be made within the localities in which the moneys were expended.

In this connection, I suggest that upon consideration, some thorough

system of local audit, at short intervals, may be devised, to restrain extravagance in some districts, and to give in each district an assurance, now wanting, that expenditures are not greater than public interests require.

UNITED STATES ATTORNEYS.

To the district attorneys was paid for the fiscal year 1881 $262,769.79 which includes the salaries of regular assistants and the amounts paid to special assistants.

Exhibit P shows who were these assistants, regular and special, and the compensation paid to each, as required by sections 385 and 195 of the Revised Statutes.

The present method of compensating United States attorneys is principally by fees.

I concur in the recommendation of the last annual report that these officers—

> Should be paid by salaries alone, which should not only compensate them for the performance of all duties now enjoined upon them by law, but also for such legal services in their respective districts as they might be required to render on behalf of the government or any of its lawful agents. The maixmum compensation of the attorney at present is $6,000. This is derived from a small salary, not exceeding the sum usually of $200, and such amount by way of fees as is chargeable in cases to which the United States is a party. These fees are inconsiderable in individual cases; and the emoluments of the officer depend upon the number, and not upon the importance of prosecutions undertaken in his district. It is believed that all these officers would prefer to be paid entirely by salaries, as not unfrequently it is unjustly suggested against them that prosecutions are encouraged for the sake of making fees. The officer should be entirely independent, and held to the performance of his duty by his own sense of justice and propriety and his official oath alone. It is not to be feared that under a system of salaries he will fail to initiate those prosecutions which are required for the enforcement of the laws of the United States; he certainly will be exempted from any imputation that they are commenced by him with any selfish object. At a late session of Congress a bill was fully matured by which a graded system of salaries was formed by which the district attorneys were to be compensated, instead, of being compensated as at present by fees. I regret extremely that the time in the session when this bill was fully matured was so late that it did not receive a full discussion and consideration. My predecessors have concurred with me in the recommendation now made, and I again urge it upon the attention of Congress. If this plan is adopted, salaries of assistant district attorneys in certain districts should also be provided for; and Congress itself should prescribe their number, compensation, and the districts in which they should be employed.

In this connection I call attention to a recommendation in the report for 1879, in the following words:

> There is also respectfully recommended to your favorable consideration the re-enactment of section 14 of the act approved August 16, 1856, which provides that United States attorneys may appoint substitute attorneys in certain cases to attend to the duities of the office when they cannot attend to them themselves, to be paid such fees and charges only as the United States attorneys would have been authorized by law to charge had they personally attended and performed the services, and the accounts of such substitutes to be sanctioned by the Attorney-General, under rules prescribed by him, upon payment of them to be made to the substitute.
>
> While this law was operative it was found convenient and serviceable in various emergencies when the attorney was unable to attend the courts. The section referred to was enacted when the officers in question were under the control of the Secretary of the Interior; and, if revived, the authority then exercised by that officer should be conferred upon the Attorney-General.
>
> It reads as follows:
>
> SEC. 14. *And be it further enacted*, That whenever from any cause it may be impossible for the district attorney to attend at court, it shall be his duty to see that a meet and proper person learned in the law, residing as near the place where the court is held as possible, does attend to such business as may appertain to the duties of his office, and in all such cases the fees and charges to be paid shall be only such as the district attorney would have been authorized by law to charge had he personally

attended and performed the service: *Provided, however*, That before any such substitution is sanctioned or payment made, the necessity thereof shall be shown to the satisfaction of the Secretary of the Interior.

CLERKS OF THE COURTS.

To the clerks of the courts there was paid for the last fiscal year $131,930.58. This sum was chiefly paid for fees and per diems approved by their courts, and adjusted by the accounting officers of the Treasury upon comparison with the returns of their official earnings. One step in the course of such settlement is that a certified copy of the report of the accounting officers of the Treasury is sent to the Attorney-general, and, having been approved by him, is by him duly transmitted for payment. In this way the Attorney-General obtains a knowledge of their official transactions, which enables him intelligently to pass upon their accounts. This is true of all clerks of the United States courts excepting in the District of Columbia. The clerk of the court in this District occupies an exceptional position, and is not required to report his earnings to the Attorney-General.

UNITED STATES COMMISSIONERS.

To United States commissioners was paid during the last fiscal year the sum of $112,570.63. For several years the Attorney-General has directed the attention of Congress to the large number of commissioners and their extravagant charges, occasioning a large increase of the expenses of the courts. In my opinion, there should be a less number of commissioners, and, to avoid the expenses of an extended transportation, they should reside at points easy of access; and, ordinarily, it should be incumbent upon the marshal to take the prisoner to the nearest commissioner. The commissioners should keep dockets, and should report to the clerk of the circuit court at the end of each month the names of all persons accused during said month, with the charge against them, the names of witnesses, the substance of their testimony, and the decision of the commissioner in each case, together with his certificate as to the responsibility of each surety on the bond taken for the appearance of the accused, and the legal charges of the officer serving the process, certifying at the same time whether a guard was employed.

Under these views, the following order has been proposed to the courts for their adoption:

ORDER OF COURT.

1st. It is hereby ordered by the court, that hereafter no warrant shall be issued by a United States commissioner for the arrest of a person charged with having violated any of the revenue laws of the United States upon the complaint of an unofficial person or a deputy marshal, unless the collector of customs or of internal revenue, or a deputy collector, or a Treasury or revenue agent, or the district attorney or one of their assistants, shall have made and attached an affidavit to such complaint, setting forth that the affiant has carefully inquired into the alleged offense; that it is such an offense as should be prosecuted, and, in his opinion, there is probable cause for the arrest of the accused, and that he requests that a warrant for the arrest of the accused be issued.

2d. It is further ordered, that whenever a warrant shall be issued by a commissioner for the arrest of any person it shall be made returnable before him, *provided* he be the commissioner nearest or most convenient to the residence of the accused. If he is not, then he shall retain a copy of the affidavit on which the warrant is issued, and make the warrant, accompanied by the original affidavit, returnable before a commissioner having an office and acting nearest to the residence of the accused; and such commissioner shall make the examination of the party and discharge, commit to prison, or admit to bail, as the case may be.

3d. It is further ordered by the court that each commissioner shall keep a well-bound book as a docket, in which he shall enter, on the day the transactions occur, the issu-

ing of each warrant, upon whose complaint and request the same was issued, the nature of the offense, and the officer to whom the warrant was delivered for service, together with the proceedings had under said warrant; there shall be entered the names of the witnesses present and examined, and their fees, the name of the guard, if any, and his fees, together with the marshal's or deputy marshal's fees; and all of said fees, together with mileage and expenses allowed by law, and a statement of the commissioner's own fees, shall be properly entered upon the warrant when returned to the commissioner. After the close of each examination the commissioner shall forward to the clerk of the United States circuit court for the proper district all the papers in the case, with a proper transcript of the proceedings, in which he shall schedule the papers forwarded.

4th. It is further ordered by the court that at the end of each month, or within five days thereafter, each commissioner shall make out and forward to the clerk of the United States circuit court for the proper district a report in duplicate of all cases instituted or examined during the month—one for the clerk of the court, the other for the Attorney-General—and a separate report of internal-revenue cases instituted or examined for the Commissioner of Internal Revenue. These reports to be made upon such forms as shall be prescribed and furnished by the Department of Justice, and they shall give a full abstract of the proceedings in each case.

5th. It is further ordered that upon receipt of said reports by the clerk, the proper one shall be filed in his office, and the others shall immediately be forwarded to the Attorney-General and Commissioner of Internal Revenue, respectively, at Washington, D. C., and no account of a commissioner shall be presented to a district or circuit court in his district until this order shall be complied with.

The clerks of the various courts are instructed to furnish each of the commissioners of their respective districts with a printed copy of this order, and also with necessary copies of blank forms, which will be supplied by the Department of Justice.

Said clerks are charged with the duty of bringing to the attention of the court any failure on the part of the commissioners to comply with the foregoing order.

I am not sufficiently informed to be able to say how generally this suggestion has been adopted, or how it has operated. It may be that whilst successful ordinarily, certain of its details are not suited to thinly-settled or other exceptional communities. Some intimations of this sort have been received at this department from quarters entitled to consideration.

THE SOLICITOR OF THE TREASURY.

I append herewith the annual report of the Solicitor of the Treasury, exhibiting the amount, character, and results of the litigation under his direction for the fiscal year ending June 30, 1881. See Exhibit Q.

JURORS.

To jurors was paid for this year the sum of $442,097.10; to witnesses, $580,748.58; and for the support of prisoners, $271,132.90.

For miscellaneous expenses was paid $268,650.22, and this includes all the current incidental expenses of each term of court, such as expenses of bailiffs, criers, fuel, lights, stationery for courts, furniture, watchmen, janitors, holding seizures, juror's meals, salaried officers summoned as witnesses, judges holding courts out of their districts, stenographic services, interpreters' fees, *post-mortem* examinations, storage, collecting evidence in United States cases, and other miscellaneous expenses necessary to holding courts.

The payments to jurors, witnesses, support of prisoners and miscellaneous expenses were, for the most part, advanced to the marshals for disbursement, in response to requisitions.

WITNESSES.

I repeat the suggestions of the last annual report respecting witnesses for an accused person unable to pay such witnesses as he may need, as follows:

Section 878, Revised Statutes, gives to persons indicted in the courts of the United States an advantage which few, if any, of the States confer. If any person so in-

dicted makes affidavit setting forth that there are witnesses material to his defense, that he cannot safely go to trial without them, what he expects to prove by each of them, &c., and that sufficient means are not at his disposal to enable him to pay the expenses of such witnesses, the courts or any judge thereof in vacation, may order such witnesses, if found within the limits of the district in which the court is held, or within one hundred miles of the place of trial, to be subpœnaed. In such case the costs incurred by the service of process and fees of witnesses are paid in the same manner as similar costs and fees are paid when witnesses are subpœnaed in behalf of the United States. By this means large numbers of witnesses are often summoned on behalf of defendants whose presence is not necessary to a fair trial of the case. This privilege is one which entails a heavy expense upon the government. It should be thoroughly guarded, and no witnesses should be allowed to be summoned merely for the purpose of attesting or attacking the credibility of other witnesses, which is one of the most frequent modes of multiplying such witnesses. I recommend that the number which the United States shall be required to summon and pay for any defendant shall not exceed four witnesses (except in capital cases), and that only these should be summoned when it is clearly shown by affidavit that their testimony goes to the merits of the case.

RENTS.

Rents paid the last fiscal year amounted to $37,555.46; a slight decrease from the previous fiscal year.

EXPENSES OF THE UNITED STATES COURTS.

These expenses annually approximate the sum of $3,000,000. The estimate for the fiscal year 1883 is $3,005,000. This is based upon a calculation of the payments already made for the years 1880 and 1881, under the new apportionment, and it is believed to be just and reliable. Respecting the apportionment of these expenses the report for 1880 stated that:

> Where an appropriation is subdivided, so that that which is appropriated for one subdivision cannot be used for any other, the whole sum requisite must necessarily be larger. The appropriation being inflexible, even if under one head there may be a saving, it cannot be availed of to relieve the increased expenditure which may occur under another. It is necessary, therefore, to estimate for each item and not allow, as might properly be done, if the items were consolidated, for the occurrence of diminished expenses in one branch which would relieve increase in another.

In this connection, it is respectfully submitted that the fee-bill at present in force for services of marshals, &c., does not adequately provide for the expenses of serving process in the Territories, particularly in the Territories of Arizona, New Mexico, and Idaho. Under a similar condition of affairs in California, Nevada, and Oregon, the fees for services of these officers have been doubled, and I submit that a similar provision for all the Territories might properly be enacted, and especially for those above named.

I renew, also, the recommendations of Attorney-General Devens, in the report for 1880, as follows:

> A considerable proportion of the business transacted in the United States courts in the southern district of Mississippi originates at and in the immediate vicinity of Vicksburg. The only place now fixed for the sessions of the United States courts is Jackson, where two terms of each court are annually held. I commend to the consideration of Congress the inquiry whether one of each of these terms might not properly be transferred to Vicksburg, if this could be done by a moderate expenditure.

PROTECTION TO CIVIL OFFICERS.

I renew the recommendation that additional legislation should be had to protect executive civil officers of the government in the performance of their duties, and also against outrages committed upon them be-

cause they have faithfully performed them. The punishment now attached to the resistance of process is not commensurate with many offenses which have been committed upon and against these officers. There is no United States punishment for the murder of one of these officers while engaged in discharging his duties, or because he has discharged them. This is a matter which should not be left to the administration of justice in the State courts. A proper regard for the safety of the officer requires that the legislation should be ample, and cover all outrages, but especially the highest outrage upon his person.

TRANSPORTING PRISONERS.

The cost of transporting United States prisoners from Arizona and New Mexico to an available penitentiary in the States, although not greater than keeping them in those Territories, is still very heavy. From the experience of the department in this matter, it is thought advisable to submit to Congress the propriety of building a United States penitentiary at a suitable place in either Arizona or New Mexico, for the imprisonment of United States prisoners from those Territories. This matter is earnestly recommended to your favorable consideration.

INSANE CONVICTS.

By the act of June 23, 1874, the Attorney-General was authorized to contract with State asylums for the care and custody of any person who should become and be insane while under the sentence of a United States court. The law upon this subject is too restricted to allow those provisions for the insane which humanity requires. The contract and payment for such care beyond the term of each imprisonment is strictly forbidden, and for this reason local institutions decline to receive prisoners who were convicted in another State than that wherein such institution is situated. Additional legislation is required to enable the Attorney-General to return such prisoners, after the expiration of their sentences, to their friends or the place of conviction, and to properly compensate State asylums until this can be done. Sometimes such prisoners are utterly friendless, and authority should be given to the Attorney-General to take proper care of them until they can be provided for by humane persons, or by some public institution. Several claims exist where institutions have continued the treatment of such prisoners beyond the term of imprisonment, when they could not, consistently with humanity, discharge them, although they were informed of the limitation as to payment which the law imposed upon this department. These claims ought to be paid by the United States, as they have arisen from humanity towards its prisoners; and if any legislation such as I have adverted to should be made, it should include these claims.

PAYMENT OF SPECIAL AND DEPUTY MARSHALS.

No appropriation was made by Congress for the payment of general and special deputy marshals at elections. Section 2031 Revised Statutes, provides for compensation for these deputies at the rate of $5 per day, when actually on duty. It was the duty of the marshal to appoint special deputies, when properly requested under section 2021, if suitable persons could be found to perform the duty, notwithstanding no appropriation was made for their payment. This duty was performed by the marshals and the services in question have been rendered in pursuance

of law. I recommend that a sufficient appropriation be made for their payment, an estimate for which will be submitted to the Committee on Appropriations.

DEFICIENCIES.

The appropriation for fees of United States attorneys for 1880 is exhausted, as well as that for fees of clerks of the United States courts.

For the attorneys will be needed $20,000, and for the clerks, $20,000. Accounts which closely approximate these amounts have been received and are awaiting settlement. At the last session of Congress these deficiencies were reported and appropriations were made, but, by mistake, were made for another year, and consequently the accounts could not be paid as was intended.

There will be needed for the year ending June 30, 1881, an appropriation of $11,000 to pay the fees of clerks for 1881, and $8,000 to pay the fees of United States commissioners, the appropriations for these fees being exhausted and many accounts having accumulated for settlement. The exact sum of the deficiencies needed will be presented in a special communication to the appropriation committees.

Claims of officers of the courts which accrued prior to July 1, 1879, are also unpaid because of deficiencies. These will be reported to Congress by the Secretary of the Treasury, under act of June 14, 1878.

ROOMS FOR THE DEPARTMENT OF JUSTICE.

The lease of rooms occupied by the Department of Justice covering the second, third, and fourth floors of the building owned by the Freedman's Savings and Trust Company, was executed by and between the said company and the Department of Justice on October 7, 1871. It was to run for ten years from October 15, 1871, and having now expired the legal representative of the company directs the attention of the department to the expiration. No action has been taken to renew the lease, it being thought best to lay the matter before the houses of Congress for appropriate action. Your early attention to the necessity of providing accommodations for this department is respectfully requested.

THE REFORM SCHOOL OF THE DISTRICT OF COLUMBIA.

The annual report of the president of the board of trustees of the Reform School, for the fiscal year ending June 30, 1881, is herewith appended. The conduct of the boys generally has been good. They have performed their tasks with cheerfulness, and studied their lessons faithfully.

At the close of the preceding fiscal year, there remained in the school 159 boys, 60 were committed during the year, making the total number in the school during said fiscal year, 219. Of this number, 67 were discharged by the board of trustees, in consequence of good conduct at school, and 14 were absent without leave.

At the close of the fiscal year ending 1881, 138 boys remained in the school. Of those sent to the school, 17 were committed by the president of the board of trustees, 8 by the supreme court of the District of Columbia, and 35 by the police court.

The president of the board of trustees refers with satisfaction to the health of the school, not only during the past year, but since its organization. No sickness of any moment has occurred, nor has there been any death during the year. Although the school has been in operation

fifteen years, and over 700 boys have been received and cared for, yet out of this number but five deaths have occurred, two by accident, and three by disease.

The farm and garden have produced very well during the summer. The boys were abundantly supplied with fresh vegetables and fruits.

During the year many repairs and improvements have been made; much grading around the building has been completed; and the additional land purchased out of money received from the trustees of the estate of Jay Cook & Co. has been put under cultivation, and, when properly fenced and fertilized, will be a great acquisition to the school. An apple orchard has been set out upon this land, and it is intended to add largely to it this season, as it is thought by the trustees to be desirable to put as much of it in fruit as possible; the cultivation and care of fruit trees not only giving the boys outdoor labor, but teaching them an occupation which in after years will be of advantage to them.

Congress having authorized the trustees to use the balance of the money in the hands of their treasurer received from the estate of Jay Cook & Co., the construction of a work-shop has been determined upon, and a contract has been entered into for the erection of the building, which, with its machinery, will enable the boys to learn useful occupations and trades, thereby increasing the revenue of the school, and enabling the inmates to earn their living after they have left the school.

An abundance of good pure water has been found by sinking wells upon the farm, and a pump has been erected with sufficient power for forcing water through all portions of the building and grounds. The usual amounts for salaries and subsistence, amounting to $31,674, have been asked through the Commissioners of the District of Congress. In addition thereto the sum of $5,000 for heating apparatus, $1,000 for the purchase of stock, and $1,000 for fencing have also been asked.

The necessity of repairing the heating apparatus and for additional fencing is apparent, and it is thought that the sum of $2,000 asked for this purpose is very moderate, and it is hoped that Congress will grant the request.

During the fiscal year the receipts of the school were as follows:

From the District of Columbia, on account of support of boys	$15,386 23
By requisition upon the Treasury	15,600 00
From sundry receipts of school	1,009 67
From the estate of Jay Cooke & Co., as per act of Congress approved June 30, 1880	8,500 00
Total	40,495 90

The report of the treasurer of the school gives in detail the disposition of this money.

The president of the board of trustees invites the attention of Congress to the urgent necessity for more room in the school for erring and wayward boys. The school now contains as many inmates as it can comfortably provide for. The necessity for increasing the facilities of the school is apparent, in view of the fact of the number of vagrant boys who are leading vicious lives, roaming about the streets, and who too often end their career in the jail. For this purpose it is estimated that an additional building, capable of accommodating 50 boys, could be erected for the sum of $8,000; and I strongly recommend that this amount be appropriated for this humane and beneficent purpose. In this connection I beg to suggest that boys from districts where there are no reform schools or other proper places for their confinement, who have been

sentenced for crimes committed against the United States, be admitted into the Reform School of this District.

The president of the board of trustees invites attention to the efficient manner in which the duties of the superintendent and physician of the institution have been performed.

With a view to raising the standard of the institution under their charge, the board of trustees appointed a committee of its members for the purpose of inspecting similar schools in other portions of the country. The committee performed this service and made a report to the board.

I commend the interests of this important institution to the careful consideration of Congress. (Exhibit R.)

UNITED STATES JAIL, DISTRICT OF COLUMBIA.

The report of the warden of the United States jail in the District of Columbia calls attention to the general good health of the inmates during the year, and to the efficient manner in which discipline has been maintained by the officers employed. The inmates have been treated in a humane manner, and every care has been taken to preserve cleanliness. For further information respecting the sanitary condition of the jail, attention is called to the report of Dr. Young, jail physician, who has faithfully attended to the wants of the sick.

No prisoner has escaped during the year. All have been supplied with wholesome and nutritious food, and those who were destitute of clothing and friendless have been furnished with such articles as were necessary to render them comfortable.

As has been the practice in previous years, religious services have been held at the jail and moral instruction imparted to the inmates by various denominations of Christians, with as favorable results as could have been expected.

Particular attention is called to that portion of the warden's report which shows the necessity of the erection of a wall inclosing the jail grounds. The jail is situated in an isolated place, remote from the city police, whose aid cannot be relied on in case of a serious disturbance or disaster, and the want of a suitable wall not only entails additional expense for properly guarding the prisoners, but is a source of great annoyance and serious apprehension to those responsible for the safety of the inmates. In connection with this, I desire to mention the fact that during the summer it was deemed necessary for the proper protection of the jail that a company of United States soldiers should be detailed.

The repairs for the most part have been made by prison labor, so that the expenditures for this purpose were mostly for the purchase of materials. The expenditures on account of these repairs, and including painting and glazing, were $1,306.52.

Prisoners convicted and sentenced by the criminal court of this District to serve a term in a penitentiary are committed to the custody of the warden, whose duty it is made by law to transport them to such penitentiaries as may have been designated by the Attorney-General. In the discharge of that duty the warden has transported 28 male and 4 female convicts to the Albany penitentiary, New York; 35 male convicts to the State prison at Auburn, N. Y.; 3 female convicts to the Erie County penitentiary at Buffalo, N. Y., making in all 70. The entire cost of transporting these prisoners was $1,509.92.

The warden has conveyed and delivered to the Reform School for Boys in the District of Columbia 54 boys, who, having been convicted of

crimes in the police and criminal courts of the District, and being under 16 years of age, were sentenced to a term in that institution.

The annual salaries of physician, engineers, guards, &c., were $30,965.40.

The other expenses connected with the jail may be found in detail in the warden's report.

The daily average of prisoners confined in the jail during the year was 201. The total number imprisoned during the year was 1,947, of whom 1,693 were males and 254 females. There were pardoned by the President of the United States 9 males and 1 female, and by the Commissioners of the District 6 males.

Of the 70 transported to penitentiaries, 11 were white males, 52 were colored, 1 was a white female, and 6 colored females. Two males were executed and 1 male died. Two males were sent to the United States Hospital for the Insane of the District of Columbia; 1,390 males and 254 females were discharged; there remained in the jail at the close of the year 161 males and 24 females, of whom 45 were white males, 2 white females, and 116 colored males and 22 colored females. There were in jail at the beginning of the year 170 males and 18 females. Committed during the year 1,523 males and 236 females charged with various offenses.

The classification of the offences charged against the prisoners committed to this jail during the year is given in the warden's report. (Exhibit S.)

UTAH.

There will be needed an appropriation of $5,000 to pay the outstanding claims under the "expenses of Territorial courts for 1881," to cover the support of the penitentiary during the last quarter of the last fiscal year and other incidental matters. The legislature of the Territory of Utah refuses to appropriate funds for the execution of the Territorial laws under Congressional legislation. If this legislation is to be maintained, special appropriations must therefore be made annually to meet the demands of justice. The legislature has been persistent for several years in this particular, and thus has escaped the charge borne by all other Territories. This amounts to about $26,000, annually.

Very respectfully,

S. F. PHILLIPS,
Acting Attorney-General.

EXHIBITS.

EXHIBIT A.—*Statement showing the number of civil suits to which the United States was a party, pending in the district and circuit courts of the United States July* 1, 1881, *with the number terminated during the fiscal year ending June* 30, 1881.

Districts.	Number pending July 1, 1881.	Number terminated during the fiscal year ending June 30, 1881.				Appealed from district court to circuit court.	Appealed from circuit court to Supreme Court.
		Judgment for the United States.	Judgment for the defendant.	Dismissed or discontinued.	Total.		
Alabama, northern district	41	47	.....	46	93	.....	.....
Alabama, middle district	14	3	2	.....	5	.....	.....
Alabama, southern district	9	15	.....	15	30	.....	1
Arkansas, eastern district	5	22	.....	4	26	.....	.....
Arkansas, western district	11	19	.....	8	27	.....	.....
California	70	11	4	15	30	.....	1
Colorado	22	2	.....	5	7	.....	.....
Connecticut	15	.....	.....	4	4	.....	.....
Delaware	5	7	.....	.....	7	.....	.....
Florida, northern district	78	.....	.....	2	2	.....	.....
Florida, southern district	1	3	.....	1	4	1	.....
Georgia, northern district	70	16	3	21	40	.....	.....
Georgia, southern district	13	4	.....	.....	4	.....	.....
Illinois, northern district	40	12	1	2	15	.....	.....
Illinois, southern district	20	6	1	3	10	.....	.....
Indiana	7	1	.....	7	8	.....	.....
Iowa	16	2	.....	4	6	.....	.....
Kansas	20	8	.....	2	10	.....	.....
Kentucky	36	6	1	7	14	.....	.....
Louisiana, eastern district	100	55	68	156	279	.....	6
Louisiana, western district*	.....	.....	.....	.....	.....	.....	.....
Maine	3	4	.....	6	10	.....	.....
Maryland	50	4	1	2	7	.....	.....
Massachusetts	243	18	3	22	43	1	.....
Michigan, eastern district	33	11	.....	5	16	.....	.....
Michigan, western district	16	3	.....	7	10	.....	.....
Minnesota	96	4	3	8	15	.....	.....
Mississippi, northern district	2	3	.....	.....	3	.....	.....
Mississippi, southern district	3	2	.....	1	3	1	.....
Missouri, eastern district	20	22	7	10	39	1	1
Missouri, western district	5	5	.....	3	8	.....	.....
Nebraska	3	3	1	3	7	.....	.....
Nevada	1	2	1	3	6	.....	.....
New Hampshire	.....	.....	.....	.....	.....	.....	.....
New Jersey	11	6	.....	9	15	.....	.....
New York, northern district	19	3	2	2	7	.....	.....
New York, southern district	707	26	5	398	429	.....	3
New York, eastern district	427	23	3	158	184	.....	.....
North Carolina, eastern district	28	59	4	3	66	.....	.....
North Carolina, western district	80	172	54	.....	226	.....	.....
Ohio, northern district	8	4	.....	2	6	.....	.....
Ohio, southern district	30	21	9	6	36	2	.....
Oregon	12	.....	.....	.....	.....	.....	.....
Pennsylvania, eastern district	254	130	38	52	220	4	2
Pennsylvania, western district	45	13	1	1	15	.....	.....
Rhode Island	.....	.....	.....	.....	.....	.....	.....
South Carolina	4	.....	.....	.....	.....	.....	.....
Tennessee, eastern district	7	32	.....	3	35	.....	.....
Tennessee, middle district	33	96	1	5	102	.....	.....

EXHIBIT A.—*Statement showing the number of civil suits to which the United States was a party, &c.*—Continued.

Districts.	Number pending July 1, 1881.	Number terminated during the fiscal year ending June 30, 1881.				Appealed from district court to circuit court.	Appealed from circuit court to Supreme Court.
		Judgment for the United States.	Judgment for the defendant.	Dismissed or discontinued.	Total.		
Tennessee, western district	4	6	.....	13	19	.....	.....
Texas, northern district	3	25	.....	9	34	.....	.....
Texas, eastern district	3	4	.....	.....	4	.....	.....
Texas, western district	41	14	5	4	23	.....	1
Vermont	6	1	.....	3	4	.....	.....
Virginia, eastern district	9	10	.....	11	21	.....	.....
Virginia, western district	27	34	2	23	59	.....	.....
West Virginia	10	16	.....	62	78	.....	.....
Wisconsin, eastern district	5	7	1	38	46	3	.....
Wisconsin, western district	8	4	.....	5	9	.....	.....
Arizona	3	2	1	.....	3	.....	.....
Dakota	15	9	.....	.....	9	.....	.....
District of Columbia	49	4	.....	5	9	.....	.....
Idaho	10	.....	.....	12	12	.....	.....
Montana†	.....	.....	.....	.....	.....	.....	.....
New Mexico†	.....	.....	.....	.....	.....	.....	.....
Utah	2	.....	.....	9	9	.....	.....
Washington	1	11	.....	.....	11	.....	.....
Wyoming	.....	3	.....	.....	2	.....	.....
Total	2, 929	1, 055	222	1, 205	2, 483	13	15

* New district. † No reports received.

EXHIBIT B.—*Statement showing the number of criminal prosecutions pending in the circuit and district courts of the United States on July 1, 1881, with the numbers terminated during the fiscal year ending June 30, 1881.*

Districts.	Number pending July 1, 1881.											Number terminated during the fiscal year ending June 30, 1881.																
	Customs prosecutions.	Internal-revenue prosecutions.	Post-office prosecutions.	Prosecutions under the election laws.	Prosecutions under civil rights acts.	Prosecutions under naturalization laws.	Prosecutions under intercourse laws.	Prosecutions under pension laws.	Prosecutions for embezzlement.	Miscellaneous prosecutions.	Total.	Customs.				Internal revenue.				Post-office.				Election laws.				
												Convictions.	Acquittals.	Nolled, discontinued, or quashed.	Total.	Convictions.	Acquittals.	Nolled, discontinued, or quashed.	Total.	Convictions.	Acquittals.	Nolled, discontinued, or quashed.	Total.	Convictions.	Acquittals.	Nolled, discontinued, or quashed.	Total.
Alabama, northern district	....	100	2	....	....	....	....	1	....	12	115	....	....	....	....	35	33	58	126	....	....	....	....	....	....	....	....
Alabama, middle district	....	25	....	30	....	....	....	....	....	25	80	....	....	....	....	20	5	45	70	5	....	....	5	1	2	9	12
Alabama, southern district	1	1	1	14	1	....	....	....	....	17	35	....	....	1	1	10	....	1	11	3	....	....	3	....	1	1	2
Arkansas, eastern district	....	1	....	....	....	....	....	....	....	....	1	....	....	....	....	16	6	13	35	1	1	....	2	....	....	....	....
Arkansas, western district	....	6	1	....	....	....	4	....	....	19	30	....	....	....	....	87	4	17	108	5	....	1	6	....	....	....	....
California	....	32	4	....	....	52	1	....	5	14	108	1	....	1	2	79	30	49	158	1	1	....	2	....	....	....	....
Colorado	....	4	4	....	....	....	....	....	3	8	19	....	....	....	....	4	1	5	10	4	1	3	8	....	....	....	....
Connecticut	....	4	....	....	....	....	....	....	....	2	6	....	....	....	....	1	1	10	12	1	....	5	6	4	....	4	8
Delaware	....	1	....	11	....	....	....	....	....	....	12	....	....	....	....	6	19	1	26	....	....	....	....	....	11	2	13
Florida, northern district	....	40	4	82	....	....	....	....	3	30	161	....	....	....	....	7	6	....	13	1	....	....	1	1	....	....	1
Florida, southern district	2	4	1	....	....	....	....	....	....	1	8	1	....	....	1	4	1	2	7	1	....	....	1	1	....	....	1
Georgia, northern district	....	205	6	....	....	....	....	1	3	25	240	....	....	....	....	150	70	10	230	5	....	....	5	....	....	....	....
Georgia, southern district	1	30	11	1	....	....	....	....	....	2	46	....	3	....	3	5	5	11	21	....	....	....	....	....	....	....	....
Illinois, northern district	....	24	14	8	....	....	....	3	1	15	65	....	....	....	....	28	....	19	47	13	1	4	18	5	....	....	5
Illinois, southern district	....	23	4	3	....	....	....	5	2	15	52	....	....	....	....	85	11	18	114	4	....	3	7	2	3	1	6
Indiana	....	14	4	7	....	....	....	4	5	5	40	....	....	....	....	5	1	27	33	6	....	4	10	2	5	3	10
Iowa	....	106	2	....	....	....	....	1	....	25	134	....	....	....	....	196	37	22	255	4	....	3	7	....	....	....	....
Kansas	....	31	3	....	....	....	....	....	....	34	68	....	....	....	....	18	2	29	49	1	....	....	1	....	....	....	....
Kentucky	....	102	3	1	....	....	....	2	....	9	117	....	....	....	....	317	46	101	464	2	....	2	4	1	....	....	1
Louisiana, eastern district	3	71	12	92	....	....	....	7	7	40	235	....	....	3	3	9	22	82	113	1	....	2	3	....	....	16	16
Louisiana, western district*	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Maine	....	8	1	....	....	....	....	....	....	....	9	....	....	6	6	10	....	42	52	1	1	....	2	....	....	....	....
Maryland	....	2	3	11	....	....	1	2	..	3	22	1	....	....	1	1	2	4	7	3	2	....	5	2	3	7	12
Massachusetts	18	79	12	3	....	....	....	7	5	69	193	5	....	1	6	39	17	52	108	6	....	4	10	2	....	....	2
Michigan, eastern district	8	7	4	....	....	....	....	2	....	13	34	15	....	....	15	34	....	2	36	....	1	....	1	....	....	....	....
Michigan, western district	....	16	....	....	....	....	....	1	1	24	42	....	....	....	....	3	....	3	6	1	....	1	2	....	....	....	....
Minnesota	....	10	1	....	....	....	4	....	....	11	26	....	....	....	....	3	....	1	4	3	2	2	7	....	....	....	....
Mississippi, northern district	....	56	7	....	....	....	....	....	....	1	64	....	....	....	....	66	15	50	131	5	1	....	6	45	7	20	72
Mississippi, southern district	....	....	....	12	....	....	....	....	....	1	13	....	....	....	....	7	4	4	15	4	1	....	5	7	3	2	12
Missouri, eastern district	....	21	3	8	....	....	....	....	....	35	67	....	....	....	....	75	11	41	127	5	....	2	7	2	....	....	2

Missouri, western district		22	6					3		2	33					125	20	34	179	6			6	1			1
Nebraska		10	1							3	14					60		14	74	3	1	2	6				
Nevada																4		1	5			1	1				
New Hampshire		3	1						1	3	8					2	3	2	7	1			1				
New Jersey	1	37	6	3							47	4	3		7	14	2	80	96	4			4	4	1		5
New York, northern district	31	75	22	14	6			11		29	188	9			9	75	3	29	107	10		3	13	37	3	17	57
New York, southern district	11	75	7	6				2	2	50	153	6		13	19	24		186	210	32	1	8	41	2		18	20
New York, eastern district		35	1	1						8	45	4			4	16		17	33	1			1	1		6	7
North Carolina, eastern district	88				2			1		6	97					38	29	59	126	3			3				
North Carolina, western district		151								3	154					322	50	98	470	5	2		7				
Ohio, northern district		7	7							12	26					22		3	25	8		6	14				
Ohio, southern district		49	13	3				10		21	96					23	11	20	54	11	1	10	22	2	4	4	10
Oregon		2	3	2						3	10					15		4	19			1	1	1		2	3
Pennsylvania, eastern district	2	70	19	1				7	3	32	139					15	3	1	19	6	3		9	2			2
Pennsylvania, western district		31	18					5		18	73					11	1	11	23	3	1		4				
Rhode Island		14								9	23					1	1	2	4								
South Carolina		80	6		140					10	236					44	64	74	182	4	3		7	1	2		3
Tennessee, eastern district		224						3	2	7	236					287	10	44	341	5	1		6				
Tennessee, middle district		143	2		1				3	25	174					266	36	82	384								
Tennessee, western district		26	6	2				2	2	59	97					16	3	1	20	1			1	1			1
Texas, northern district		53	11		6		2	2	4	17	95					2	6	27	35	6	13	2	21			5	5
Texas, eastern district		71	10	19					1	5	106					5	2	51	58	4	1	2	7	33		11	44
Texas, western district	137	55	8	14					7	32	253	44	34	22	100	22	22	20	64	8	8	3	19	6	3		9
Vermont	5	14						1		2	22	1		1	2			14	14	2		3	5				
Virginia, eastern district		6	1	7						2	16					11	3	2	16	4	1	3	8				
Virginia, western district		384	1					4		6	395					187	23	35	245	2			2				
West Virginia		400	16					1		58	475					78	32	361	471	1	1	2	4				
Wisconsin, eastern district										4	4					7	1		8	3		1	4				
Wisconsin, western district																1		6	7			1	1				
Arizona		2								3	3																
Dakota		41	4				10		17	81	153					4	1	5	10	1	1	2	4				
District of Columbia										673	673											2	2				
Idaho		1					11			9	21						2	3	5								
Montana†																											
New Mexico†																											
Utah										80	80							3	3								
Washington										16	16									1			1				
Wyoming										6	6						1		1	1		3	4				
Total	308	3,104	276	335	158	63	33	88	77	1,749	6,211	91	40	48	179	3,017	678	2,008	5,703	222	50	91	363	166	48	128	342

* New district.

† No reports received.

EXHIBIT B.—*Statement showing the number of criminal prosecutions pending in the district and circuit courts of the United States, &c.*—Continued.

Districts.	Number terminated during the fiscal year ending June 30, 1881.																							
	Civil rights acts.				Naturalization laws.				Intercourse laws.				Pension laws.				Embezzlement.				Miscellaneous.			
	Convictions.	Acquittals.	Nolled, discontinued, or quashed.	Total.	Convictions.	Acquittals.	Nolled, discontinued, or quashed.	Total.	Convictions.	Acquittals.	Nolled, discontinued, or quashed.	Total.	Convictions.	Acquittals.	Nolled, discontinued, or quashed.	Total.	Convictions.	Acquittals.	Nolled, discontinued, or quashed.	Total.	Convictions.	Acquittals.	Nolled, discontinued, or quashed.	Total.
Alabama, northern district															1	1					6	7	5	18
Alabama, middle district																					79	34	23	136
Alabama, southern district																					102	4	18	124
Arkansas, eastern district																					10	5	3	18
Arkansas, western district									102	2	20	124	1			1					95	34	33	162
California						3	2	5	5		2	7									11	3	4	18
Colorado																					5	2	4	11
Connecticut					1		4	5							5	5					3		6	9
Delaware																								
Florida, northern district																						11		12
Florida, southern district																								
Georgia, northern district																					1	2	4	7
Georgia, southern district																								
Illinois, northern district														1	2	3					19	12	2	33
Illinois, southern district													2	1	5	8					33	7	20	60
Indiana													5	6	4	15	1		3	4	13	2	16	31
Iowa													1	1	1	3					16	4	2	22
Kansas																					21	7	16	44
Kentucky																					5	1	6	12
Louisiana, eastern district														3		3			6	6	9	1	17	27
Louisiana, western district *																								
Maine																					4	2	4	10
Maryland					1	2		3					6			6			1	1	8		4	12
Massachusetts																	2		1	3	48	15	15	78
Michigan, eastern district													35	3		38					15	1	2	18
Michigan, western district													2			2	1			1	15	2	13	30
Minnesota									8	1	1	10									5	2	4	11
Mississippi, northern district			3	3																	4	5	1	10
Mississippi, southern district																					2	1	9	12
Missouri, eastern district																					19		3	22

Missouri, western district													1			1					3			3
Nebraska																		1	4	5	5	1	4	10
Nevada									2			2												
New Hampshire																								
New Jersey													1			1	3			3	26	4		30
New York, northern district						1		1					6	3	6	15			3	3	8	2	8	18
New York, southern district															1	1	1			1	32	4	63	99
New York, eastern district							3	3													12	1	2	15
North Carolina, eastern district																					14	8		22
North Carolina, western district													1			1					2			2
Ohio, northern district													2			2					7	2	10	19
Ohio, southern district													4			4	1		2	3	9	1	7	17
Oregon									65	2	8	75									17	1	3	21
Pennsylvania, eastern district					2	1		3					1	3		4					17	9		26
Pennsylvania, western district													9	2	4	15	5		6	11	21	6	2	29
Rhode Island																								
South Carolina			81	81																	2	4	9	15
Tennessee, eastern district																					2	1	3	6
Tennessee, middle district													2			2					3			3
Tennessee, western district																					12	5	1	18
Texas, northern district													1			1			1	1	1	11	3	15
Texas, eastern district																	1			1	4	3		7
Texas, western district																		2	2	4	4	9	7	20
Vermont																					1			1
Virginia, eastern district																					2	1		3
Virginia, western district			11	11											1	1					1	1	3	5
West Virginia																					1	4	6	11
Wisconsin, eastern district																					21		1	22
Wisconsin, western district									5			5		2		2					12	2	7	21
Arizona																					10			10
Dakota									16	3	17	36									23	9	30	62
District of Columbia																					2,061	642	36	2,739
Idaho									2			2									2		4	6
Montana*																								
New Mexico†																								
Utah																					15	9	19	43
Washington									11	1	4	16									5			5
Wyoming																					3	10	4	17
Total			95	95	4	7	9	20	216	9	52	277	80	25	30	135	15	3	29	47	2,907	914	466	4,287

* New district.

† No reports received.

EXHIBIT C.—*Statement of the amounts arising from civil suits to which the United States was a party, and from criminal prosecutions in the circuit and district courts of the United States, during the fiscal year ending June* 30, 1881.

Districts.	Amount of judgments obtained during the year in favor of the United States.	Amount of fines, forfeitures, and penalties imposed during the year.	Amount realized from judgments obtained during the year.	Amount realized on fines, forfeitures, and penalties imposed during the year.	Amount realized on fines, forfeitures, and penalties imposed in former years.	Amount realized on judgments obtained in former years.	Amount realized during the year by compromise and otherwise, not included in the foregoing.
Alabama, northern district	$7,065 90	$2,000 00	$215 00	$200 00	.....	.....	.....
Alabama, middle district	616 54	2,514 00	354 75	251 00	.....	.....	.....
Alabama, southern district	21,104 21	510 50	1,623 25	114 50	.....	$258 73	.....
Arkansas, eastern district	5,223 90	8,514 09	1,390 19	497 09	.....	1,115 40	.....
Arkansas, western district	11,139 40	18,757 95	189 40	1,054 50	.....	.....	$100 00
California	14,887 36	20,388 00	11,444 66	577 00	.....	.....	.....
Colorado	23,153 53	1,685 00	27 69	775 00	.....	6,505 00	299 35
Connecticut	.....	380 62	.....	251 87	.....	1,596 84	234 11
Delaware	10,791 93	600 00	757 89	.....	.....	.....	.....
Florida, northern district	.....	35 00	.....	35 00	.....	714 22	334 37
Florida, southern district	1,745 96	482 65	1,202 55	245 38	.....	.....	24 35
Georgia, northern district	8,625 49	11,595 00	100 00	743 78	.....	586 08	653 28
Georgia, southern district	276 50	1,211 52	.....	1,211 52	.....	.....	.....
Illinois, northern district	5,334 26	2,070 50	453 16	1,295 50	$5 00	4,981 12	1,807 96
Illinois, southern district	389 11	2,422 00	310 12	2,315 14	870 12	375 16	.....
Indiana	.....	738 00	.....	563 00	1 00	110 00	5,802 13
Iowa	418 00	3,886 00	82 63	1,682 48	2,828 70	.....	82 63
Kansas	3,541 86	1,365 00	1,203 91	788 80	.....	25 00	26 20
Kentucky	1,780 76	17,842 01	1,146 97	554 38	.....	347 05	153 97
Louisiana, eastern district	199,449 00	270 00	2,766 00	.....	.....	2,741 50	6,344 18
Louisiana, western district*	.....	.....	.....	.....	.....	.....	.....
Maine	8,857 85	900 00	8,857 85	.....	2,001 04	.....	192 62
Maryland	4,033 68	4,173 02	4,033 68	72 00	25 00	.....	.....
Massachusetts	13,374 16	2,298 41	12,240 37	1,553 05	1,047 66	59 55	3,680 56
Michigan, eastern district	7,643 21	14,736 00	6,875 71	9,611 00	.....	.....	250 00
Michigan, western district	1,378 62	6,117 28	562 72	5,820 28	.....	1,000 00	2,361 60
Minnesota	1,222 01	1,177 30	.....	465 00	.....	.....	.....
Mississippi, northern district	607 68	1,987 00	.....	387 00	170 78	.....	.....
Mississippi, southern district	720 00	2,333 60	200 00	1,688 65	.....	.....	.....
Missouri, eastern district	61,135 28	2,604 01	3,871 90	1,575 24	.....	400 00	210 00
Missouri, western district	37,762 49	6,234 00	300 00	207 00	.....	407 88	.....
Nebraska	8,372 99	2,845 25	.....	1,129 52	255 95	.....	4,550 00
Nevada	27,352 22	10,009 68	957 18	744 90	10 00	.....	.....
New Hampshire	.....	100 00	.....	.....	.....	.....	.....
New Jersey	1,100 00	4,906 00	.....	206 00	20 00	.....	2,155 73

New York, northern district	500 00	7,395 00		3,240 00			5,000 00
New York, southern district	42,430 17	11,022 18	34,454 05	7,396 18		29,013 62	74 811 69
New York, eastern district	13,713 59	886 00	1 60	245 00	25 00		1,369 95
North Carolina, eastern district	13,515 52	5,689 62	900 79	867 54	307 64	522 78	
North Carolina, western district	188,694 14	14,446 00	148 57	354 86	345 88	39 39	
Ohio, northern district	9,816 72	4,823 83	9,406 28	1,921 67	301 00	24 15	
Ohio, southern district	15,400 05	8,320 00	6,101 18	125 00	250 00	2,041 80	625 00
Oregon	210 30	2,896 86	210 30	1,686 86	59 44	2,182 96	400 00
Pennsylvania, eastern district	326,506 38	5,271 25	10,008 29	129 00	100 00	1,746 88	21,928 08
Pennsylvania, western district	8,023 73	1,205 00	2,799 40	105 00			54 41
Rhode Island		100 00					
South Carolina		4,280 00					
Tennessee, eastern district	7,925 13	11,923 14	433 00	180 63		562 05	
Tennessee, middle district	28,004 10	14,229 30	1,019 91	2,805 60	2,226 63	9,360 95	
Tennessee, western district	1,426 00	4,810 31	740 95		408 01	95 26	
Texas, northern district	5,514 40	2,410 00	149 92	10 00			
Texas, eastern district	18,608 47½	12,828 00	1,100 21	727 00	100 00	835 88	
Texas, western district	3,010 00	3,590 00	410 00	410 00			
Vermont	1,385 00	1,143 36	1,385 00	1,143 36		298 25	3,400 48
Virginia, eastern district	6,372 22	1,505 00	150 00				
Virginia, western district	10,389 32	2,719 00	1,686 76	829 42		716 04	472 57
West Virginia	13,320 80	10,475 00					
Wisconsin, eastern district	6,978 25	454 00	1,642 03	181 00			1,693 77
Wisconsin, western district	2,023 60	1,697 70	1,915 87	434 25		862 62	
Arizona	7,000 00						
Dakota	9,834 36	10,545 43	8,670 15	2,124 43		513 96	
District of Columbia	477 27	321 00		266 00			949 97
Idaho		438 00					
Montana†							
New Mexico†							
Utah		325 00					
Washington	575 34	1,261 00	575 34	761 00			
Wyoming	2,485 97	35 00	285 16				
Total	1,233,244 73½	314,735 37	135,362 34	62,559 38	11,358 85	70,040 12	139,968 96

*New district.

†No reports received.

EXHIBIT D.—*Statement showing the number of civil suits, to which the United States was not party, commenced and terminated in the circuit and district courts of the United States during the fiscal year ending June* 30, 1881, *with the number pending July* 1, 1881.

Districts.	Number commenced during the fiscal year ending June 30, 1881.			Number terminated during the fiscal year ending June 30, 1881.										Number pending July 1, 1881.		
				Admiralty.					Other suits.							
	Admiralty.	Other suits.	Total.	Judgment for plaintiff.	Judgment for defendant.	Dismissed or discontinued.	Not stated.	Total.	Judgment for plaintiff.	Judgment for defendant.	Dismissed or discontinued.	Not stated.	Total.	Admiralty.	Other suits.	Total.
Alabama, northern district	.....	10	10	.....	.....	.....	.....	.....	11	5	.....	.....	16	.....	30	30
Alabama, middle district	.....	26	26	.....	.....	.....	.....	.....	18	20	.....	.....	38	.....	44	44
Alabama, southern district	6	10	16	6	.....	.....	.....	6	10	.....	.....	.....	10	1	31	32
Arkansas, eastern district	4	274	278	1	3	.....	.....	4	110	.....	.....	45	155	.....	182	182
Arkansas, western district	.....	40	40	.....	.....	.....	.....	.....	10	1	.....	.....	11	.....	44	44
California	34	278	312	14	3	.....	.....	17	36	162	.....	.....	198	85	333	418
Colorado	.....	220	220	.....	.....	.....	.....	.....	44	10	.....	.....	54	.....	166	166
Connecticut	16	65	81	1	1	.....	6	8	12	4	.....	19	35	12	361	373
Delaware	11	12	23	6	7	.....	.....	13	6	7	.....	.....	13	18	22	40
Florida, northern district	7	31	38	4	.....	.....	.....	4	6	11	.....	.....	17	3	137	140
Florida, southern district	33	.....	33	34	.....	.....	.....	34	1	.....	.....	.....	1	3	.....	3
Georgia, northern district	.....	21	21	.....	.....	.....	.....	.....	12	.....	.....	2	14	.....	43	43
Georgia, southern district*	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Illinois, northern district	79	421	500	7	134	.....	.....	141	207	1,047	.....	.....	1,254	216	2,034	2,250
Illinois, southern district	12	223	235	2	.....	.....	7	9	135	23	.....	28	186	12	551	563
Indiana	2	317	319	3	.....	.....	.....	3	132	22	.....	223	377	3	351	354
Iowa	3	393	396	1	.....	.....	.....	1	165	64	.....	14	243	.....	936	936
Kansas	.....	340	340	.....	.....	.....	.....	.....	174	71	.....	.....	245	.....	588	588
Kentucky	23	114	137	2	6	.....	2	10	26	21	.....	3	50	11	73	84
Louisiana, eastern district	507	.....	507	220	17	.....	28	265	.....	.....	.....	.....	.....	242	.....	242
Louisiana, western district†	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Maine	16	63	79	6	.....	.....	10	16	14	31	.....	10	55	2	154	156
Maryland	94	107	201	14	.....	.....	51	65	19	3	.....	8	30	42	131	173
Massachusetts	94	332	426	30	46	.....	1	77	100	119	.....	28	247	151	1,089	1,240
Michigan, eastern district	282	221	503	168	16	.....	.....	184	117	17	.....	.....	134	750	.....	750
Michigan, western district	19	136	155	7	8	.....	.....	15	76	60	.....	.....	136	12	811	823
Minnesota	4	162	166	2	.....	.....	.....	2	66	19	32	.....	117	7	598	605
Mississippi, northern district	.....	113	113	.....	.....	.....	.....	.....	62	18	.....	.....	80	.....	102	102
Mississippi, southern district	22	79	101	9	4	.....	.....	13	44	26	.....	.....	70	11	82	93
Missouri, eastern district	6	155	161	3	.....	.....	7	10	89	.....	.....	90	179	4	168	172
Missouri, western district	8	103	111	.....	.....	.....	.....	.....	59	.....	.....	90	149	8	194	202
Nebraska	.....	235	235	.....	.....	.....	.....	.....	84	76	.....	.....	160	.....	170	170

Nevada	1	29	30	.....	.....	.....	1	1	3	5	6	.....	14	52	.....	52
New Hampshire	1	15	16	.....	.....	.....	.....	.....	13	4	.....	12	29	.....	83	83
New Jersey	64	114	178	16	2	.....	9	27	31	14	.....	35	80	40	94	134
New York, northern district	32	436	468	.....	1	10	.....	11	48	7	.....	57	112	44	2,997	3,041
New York, southern district	548	618	1,166	62	18	.....	133	213	53	32	.....	200	285	359	4,948	5,307
New York, eastern district	304	89	393	13	8	.....	161	182	8	10	.....	19	37	605	402	1,007
North Carolina, eastern district	.....	11	11	.....	.....	.....	.....	.....	22	6	.....	.....	28	.....	41	41
North Carolina, western district	.....	13	13	.....	.....	.....	.....	.....	11	6	.....	3	20	.....	73	73
Ohio, northern district	36	185	221	25	7	.....	1	33	113	56	.....	23	192	22	447	469
Ohio, southern district	28	113	141	10	3	.....	.....	13	11	15	.....	.....	26	15	86	101
Oregon	20	80	100	9	.....	.....	7	16	7	.....	.....	15	22	4	58	62
Pennsylvania, eastern district	91	216	307	26	10	35	.....	71	44	29	158	.....	231	71	797	868
Pennsylvania, western district	26	23	49	17	3	.....	.....	20	8	6	.....	.....	14	31	118	149
Rhode Island	13	23	36	14	.....	.....	.....	14	9	12	.....	.....	21	6	108	114
South Carolina	24	59	83	11	1	9	.....	21	57	3	.....	.....	60	3	142	145
Tennessee, eastern district	.....	27	27	.....	.....	.....	.....	.....	14	7	.....	.....	21	.....	70	70
Tennessee, middle district	.....	46	46	.....	.....	.....	.....	.....	24	18	.....	.....	42	.....	67	67
Tennessee, western district	20	40	60	5	5	.....	.....	10	35	10	.....	.....	45	20	.....	20
Texas, northern district	.....	114	114	.....	.....	.....	.....	.....	58	12	.....	25	95	.....	118	118
Texas, eastern district	23	59	82	7	9	.....	.....	16	31	43	.....	5	79	25	121	146
Texas, western district	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Vermont	.....	41	41	.....	.....	.....	.....	.....	11	19	.....	.....	30	.....	76	76
Virginia, eastern district	28	32	60	22	5	.....	.....	27	9	5	.....	4	18	4	85	89
Virginia, western district	.....	18	18	.....	.....	.....	.....	.....	9	2	3	.....	14	.....	114	114
West Virginia	6	78	84	4	.....	.....	.....	4	58	3	.....	.....	61	9	476	485
Wisconsin, eastern district	37	113	150	11	.....	31	.....	42	29	6	73	.....	108	23	325	348
Wisconsin, western district	.....	50	50	.....	.....	.....	.....	.....	12	5	.....	10	27	.....	174	174
Total of each class of cases	2,584	7,143	9,727	792	317	85	424	1,618	2,573	2,172	272	968	5,985	2,926	21,445	24,371

*No report. †New district.

EXHIBIT D.—*Statement of the amount of judgments in civil suits, to which the United States was not a party, in the circuit and district courts of the United States, during the fiscal year ending June* 30, 1881.

[Supplement.]

Districts.	Amount of judgments for plaintiffs.			Amount of judgments for defendants.		
	Admiralty.	Other suits.	Total.	Admiralty.	Other suits.	Total.
Alabama, northern district	.....	$8,506 65	$8,506 65	.....	.....	.....
Alabama, middle district	.....	359,623 83	359,623 83	.....	.....	.....
Alabama, southern district	$4,629 96	24,334 09	28,964 05	.....	.....	.....
Arkansas, eastern district	.....	224,300 00	224,300 00	.....	.....	.....
Arkansas, western district	.....	15,512 03	15,512 03	.....	.....	.....
California	32,527 05	225,422 12	257,949 17	.....	$1,631 80	$1,631 80
Colorado	.....	91,227 13	91,227 13	.....	.....	.....
Connecticut	670 00	32,067 75	32,737 75	$121 21	274 10	395 31
Delaware	483 59	4,181 89	4,665 48	.....	.....	.....
Florida, northern district	4,002 67	261,577 65	265,580 32	.....	.....	.....
Florida, southern district	13,865 13	300 00	14,165 13	.....	.....	.....
Georgia, northern district	.....	28,847 79	28,847 79	.....	.....	.....
Georgia, southern district*	.....	.....	.....	.....	.....	.....
Illinois, northern district	5,413 03	2,519,070 93	2,524,483 96	.....	1,290 00	1,290 00
Illinois, southern district	217 37	11,785,469 39	11,785,686 76	.....	.....	.....
Indiana	508 75	1,202,155 78	1,202,664 53	.....	84 39	84 39
Iowa	100 00	266,321 16	266,421 16	.....	.....	.....
Kansas	.....	248,118 10	248,118 10	.....	1,975 30	1,975 30
Kentucky	6,260 12	19,083 51	25,343 63	.....	438 58	438 58
Louisiana, eastern district	1,825,063 00	.....	1,825,063 00	7,662 00	.....	7,662 00
Louisiana, western district†	.....	.....	.....	.....	.....	.....
Maine	2,538 17	33,709 30	36,247 47	.....	23 67	23 67
Maryland	18,811 86	46,223 56	65,035 42	.....	.....	.....
Massachusetts	60,825 96	200,000 00	260,825 96	.....	1,000 00	1,000 00
Michigan, eastern district	34,055 83	3,771,356 67	3,805,412 50	.....	1,127 00	1,127 00
Michigan, western district	1,923 99	241,205 94	243,129 93	63 88	221 35	285 23
Minnesota	874 86	311,364 81	312,239 67	.....	2,387 23	2,387 23
Mississippi, northern district	.....	173,377 04	173,377 04	.....	.....	.....
Mississippi, southern district	3,576 29	246,715 18	250,291 47	.....	3,409 61	3,409 61
Missouri, eastern district	3,444 00	650,248 82	653,692 82	.....	.....	.....
Missouri, western district	.....	480,747 29	480,747 29	.....	.....	.....
Nebraska	.....	102,827 41	102,827 41	.....	6,903 00	6,903 00
Nevada	.....	209,775 00	209,775 00	.....	.....	.....
New Hampshire	.....	17,828 64	17,828 64	.....	39 65	39 65
New Jersey	7,118 91	168,131 11	175,250 02	54 50	27,596 84	27,651 34
New York, northern district	.....	145,566 28	145,566 28	.....	465 47	465 47
New York, southern district	54,275 98	338,458 92	392,734 90	4,151 44	7,952 31	11,103 75
New York, eastern district	38,102 86	388,343 91	426,446 77	1,678 47	1,354 45	3,032 92
North Carolina, east'n district	.....	102,294 69	102,294 69	.....	393 97	393 97
North Carolina, west'n district	.....	7,824 64	7,824 64	.....	.....	.....
Ohio, northern district	1,682 71	758,158 68	759,841 39	.....	1,321 55	1,321 55
Ohio, southern district	819 52	47,363 41	48,182 93	6 50	190 28	196 78
Oregon	47,112 70	52,961 14	100,073 84	.....	.....	.....
Pennsylvania, east'n district	71,574 89	157,680 77	229,255 66	.....	.....	.....
Pennsylvania, west'n district	5,776 65	2,531 98	8,308 63	85 38	656 43	741 81
Rhode Island	5,866 91	168,742 48	174,609 39	.....	2,647 70	2,647 70
South Carolina	8,816 91	23,935 07	32,751 98	.....	.....	.....
Tennessee, eastern district	.....	5,386 69	5,386 69	.....	117 00	117 00
Tennessee, middle district	.....	30,880 20	30,880 20	.....	661 04	661 04
Tennessee, western district	9,000 00	526,334 45	535,334 45	.....	.....	.....
Texas, northern district	.....	75,506 62	75,506 62	.....	.....	.....
Texas, eastern district	2,850 68	462,689 80	465,540 48	.....	4,795 00	4,795 00
Texas, western district*	.....	.....	.....	.....	.....	.....
Vermont	.....	77,115 28	77,115 28	.....	.....	.....
Virginia, eastern district	7,199 86	7,168 68	14,368 54	350 00	.....	350 00
Virginia, western district	.....	10,889 92	10,889 92	.....	51 81	51 81
West Virginia	1,940 50	211,480 20	213,420 70	.....	7,280 00	7,280 00
Wisconsin, eastern district	9,362 83	46,277 09	55,639 92	.....	5,607 03	5,607 03
Wisconsin, western district	.....	40,474 06	40,474 06	.....	169 70	169 70
Total	2,291,293 54	27,657,695 53	29,948,989 07	13,173 38	82,066 26	95,239 64

* No report.

† New district.

EXHIBIT E.—*Tabular statement of causes heretofore disposed of, and also of those now pending, in the Court of Claims.*

Calendar year.	Number of suits brought in each year.			Number of suits closed by report* or judgment† each year.					Suits pending of the number brought in each year aforesaid.		Recovery by United States on counter-claims.
	Number of suits.	Amount claimed.	Number of cases in which amount is not stated in petition.	Number for claimants.	Amount claimed.	Amount of recovery.	Number for defendants.	Amount claimed.	Number of suits pending.	Amount claimed.	
1855	464	$5,910,801 84	142	.....	.....	.....	.....	.....	.....	.....	.....
1856	320	3,944,813 15	76	25	$370,301 99	$312,324 54	20	$167,314 86	.....	.....	.....
1857	823	3,499,058 55	31	58	254,177 20	144,924 02	49	1,180,239 94	.....	.....	.....
1858	173	1,382,158 05	83	5	179,982 73	46,858 22	31	547,001 70	.....	.....	.....
1859	40	958,867 11	21	8	76,386 13	25,539 36	53	2,187,535 86	.....	.....	.....
1860	35	953,480 63	16	10	401,541 37	89,821 04	26	302,113 71	.....	.....	.....
1861	7	380,970 92	4	4	11,168 75	8,369 00	9	195,961 96	.....	.....	.....
1862	17	110,381 75	5	6	159,324 45	48,302 05	.....	.....	.....	.....	.....
1863	114	2,103,503 43	2	1	(‡)	(§)	406	3,081,662 78	.....	.....	.....
1864	154	1,614,914 37	13	5	180,801 60	73,402 32	330	4,041,952 45	.....	.....	.....
1865	46	1,347,540 17	2	8	245,885 28	126,704 14	23	630,860 76	.....	.....	.....
1866	361	6,593,772 77	234	18	247,218 74	133,960 90	206	2,146,404 13	1	$53,640 00	.....
1867	488	13,086,344 14	1	50	2,005,951 94	872,863 01	114	1,288,092 75	1	11,040 00	.....
1868	745	27,938,800 48	10	98	1,466,883 07	782,620 40	24	591,630 45	8	2,509,350 00	.....
1869	2,344	6,794,619 64	6	49	1,411,570 31	855,326 21	72	1,070,004 69	3	366,812 00	.....
1870	161	4,055,730 42	46	114	1,568,154 57	1,035,152 43	53	2,241,739 04	1	128,152 99	$1,647 58
1871	114	3,269,867 96	1	65	1,578,968 13	1,161,615 53	36	968,931 63	7	15,055 42	.....
1872	450	8,981,125 45	2	132	2,831,172 55	2,028,865 50	17	461,429 21	2	16,398 81	.....
1873	1,125	5,090,165 51	2	1,528	5,775,255 42	3,627,957 21	30	696,283 32	3	47,254 93	.....
1874	2,180	30,849,722 12	14	731	1,645,580 81	908,622 30	65	1,119,713 10	7	1,087,987 13	.....
1875	738	3,971,371 59	30	234	4,035,542 57	2,949,136 09	59	2,850,959 23	6	1,104,314 62	.....
1876	592	3,302,910 55	9	27	1,524,476 29	1,126,726 10	2,431	13,783,158 91	4	421,034 00	4,419 39
1877	397	8,015,936 99	1	32	472,561 84	203,710 14	439	10,462,100 92	12	403,009 38	6,106 53
1878	102	4,339,622 11	.....	65	324,147 75	189,697 92	2,498	39,864,979 94	17	2,040,806 06	.....
1879	164	2,313,318 49	.....	43	1,223,615 17	416,549 18	157	13,799,405 19	113	1,906,982 37	618,627 73
1880	256	762,752 64	.....	191	1,018,657 02	332,618 89	1,306	2,350,037 21	56	621,022 53	18,884 22
1881	391	17,682,217 45	5	64	1,722,028 62	855,099 50	163	5,181,802 15	372	16,516,263 42	372,576 91
Total	12,801	169,254,768 28	756	3,571	30,731,354 30	18,356,766 00	8,617	111,211,315 89	613	27,249,123 66	1,022,262 36

* The act organizing the Court of Claims was passed February 4, 1855 (10 Stat., 612), by which the court were directed to hear and determine claims and report the cases and facts to Congress, with their opinion.

† On the 3d of November, 1863 (12 Stat., 765), the said act was amended, and the court authorized to render final judgments, with right of appeal to the Supreme Court of the United States.

‡ No amount claimed.

§ Judgment for land-scrip.

EXHIBIT F.—*General statement of condition of all appropriations placed under the Department of Justice, from which payments were made during the fiscal year ending June* 30, 1881, *as required by section* 3, *act approved June* 30, 1879.

Expenses of United States courts, 1877 and prior years:		
Appropriation, act June 16, 1880		$6,172 87
Special appropriation, act June 16, 1880, in favor of heirs of William Selden		1,123 28
Special appropriation, act June 16, 1880, in favor of James F. Fagan		2,916 27
Special appropriation, act June 16, 1880, in favor of A. G. Sharpe		92 85
Special appropriation, act June 16, 1880, in favor of M. Sparks.		450 00
	10,755 27	
Designated payments as indicated in act of June 16, 1880, and according to Appendix B, digest of appropriations, 1881..	10,748 12	
Balance July 1, 1881		$7 15
Expenses of United States courts, 1878 and prior years:		
Appropriation, act of March 3, 1881	19,481 57	
Payments during fiscal year	11,305 28	
Balance July 1, 1881		8,176 29
Reappropriation, expenses United States courts, 1878, act June 16, 1880:		
Balance July 1, 1880	29,506 41	
Payments during fiscal year	29,429 49	
Balance July 1, 1881		76 92
Balance of appropriation, expenses of United States courts, 1879:		
Balance July 1, 1880	291,764 86	
Repayments during fiscal year	13,436 31	
	305,201 17	
Payments during fiscal year	304,583 99	
Balance July 1, 1881		617 18
Balance of appropriation, fees and expenses of marshals, United States courts, 1880:		
Balance July 1, 1880	278,700 00	
Repayments during fiscal year	9,473 11	
	288,173 11	
Payments during fiscal year	273,457 10	
Balance July 1, 1881		14,716 01
Balance of appropriation, fees of district attorneys, United States courts, 1880:		
Balance July 1, 1880	53,765 70	
Repayments during fiscal year	3,296 10	
	57,061 80	
Payments during fiscal year	57,058 26	
Balance July 1, 1881		3 54
Balance of appropriation, fees of clerks, United States courts, 1880:		
Balance July 1, 1880	49,519 35	
Payments during fiscal year	49,295 44	
Balance July 1, 1881		223 91

Balance of appropriation, fees of commissioners, United States courts, 1880:		
Balance July 1, 1880	$57,453 68	
Payments during fiscal year	49,459 46	
Balance July 1, 1881		$7,994 22
Balance of appropriation, fees of jurors, United States courts, 1880:		
Balance July 1, 1880	29,323 70	
Repayments during fiscal year	73,698 82	
	103,022 52	
Payments during fiscal year	18,637 41	
Balance July 1, 1881		84,385 11
Balance of appropriation, fees of witnesses, United States courts, 1880:		
Balance July 1, 1880	66.657 08	
Repayments during fiscal year	66,184 12	
	132,841 20	
Amount transferred by Treasury counter-warrant to credit of the appropriation for miscellaneous expenses, United States courts, 1880	15,000 00	
Payments during fiscal year	20,257 24	
	35,257 24	
Balance July 1, 1881		97,583 96
Balance of reappropriation, support of prisoners, United States courts, 1880:		
Balance July 1, 1880	97,014 19	
Repayments during fiscal year	13,882 84	
	110,897 03	
Payments during fiscal year	103,948 16	
Balance July 1, 1881		6,948 87
Balance of appropriation, rent of court rooms, United States courts, 1880:		
Balance July 1, 1880	22,114 83	
Payments during fiscal year	21,649 55	
Balance July 1, 1881		465 28
Balance of reappropriation, miscellaneous expenses, United States courts, 1880:		
Balance July 1, 1880	17,394 34	
Repayments during fiscal year	15,587 57	
Reapportionment of appropriation by Treasury counter-warrant, transferred from appropriation for fees of witnesses, 1880	15,000	
	47,981 91	
Payments during fiscal year	31,958 48	
Balance July 1, 1881		16 023 43
Fees and expenses of marshals, United States courts, 1881:		
Appropriation, act of June 16, 1880	650,000 00	
Repayments during fiscal year	269 95	
	650,269 95	
Payments during fiscal year	610,731 21	
Balance July 1, 1881		39,538 74

Fees of district attorneys, United States courts, 1881:		
Appropriation, act June 16, 1880	$350,000 00	
Reappropriation, act March 3, 1881	20,000 00	
	370,000 00	
Payments during fiscal year	262,769 79	
Balance July 1, 1881		$107,230 21
Fees of clerks, United States courts, 1881:		
Appropriation, act June 16, 1880	160,000 00	
Reappropriation, act March 3, 1881	20,000 00	
	180,000 00	
Payments during fiscal year	131,930 58	
Balance July 1, 1881		48,069 42
Fees of commissioners, United States courts, 1881:		
Appropriation, act June 16, 1880	140,000 00	
Payments during fiscal year	112,570 63	
Balance July 1, 1881		27,429 37
Fees of jurors, United States courts, 1881:		
Appropriation, act June 16, 1880	400,000 00	
Reappropriation, act March 3, 1881	40,000 00	
Repayments during fiscal year	4,994 35	
	444,994 35	
Payments during fiscal year	442,097 10	
Balance July 1, 1881		2,897 25
Fees of witnesses, United States courts, 1881:		
Appropriation, act June 16, 1880	550,000 00	
Reappropriation, act March 3, 1881	30,000 00	
Repayments during fiscal year	9,824 60	
	589,824 60	
Payments during fiscal year	580,780 58	
Balance July 1, 1881		9,044 02
Support of prisoners, United States courts, 1881:		
Appropriation, act June 16, 1880	200,000 00	
Reappropriation, act March 3, 1881	100,000 00	
Repayments during fiscal year	6,083 65	
	306,083 65	
Payments during fiscal year	271,132 90	
Balance July 1, 1881		34,950 75
Rent of court rooms, United States courts, 1881:		
Appropriation, act June 16, 1880	75,000 00	
Payments during fiscal year	37,555 46	
Balance July 1, 1881		37,444 54
Miscellaneous expenses, United States courts, 1881:		
Appropriation, act June 16, 1880	300,000 00	
Repayments during fiscal year	1,697 45	
	301,697 45	
Payments during fiscal year	268,650 22	
Balance July 1, 1881		33,047 23
Salaries Department of Justice, 1881:		
Appropriation, act of June 15, 1880	101,680 00	
Payments during fiscal year	101,654 99	
Balance July 1, 1881		25 01

Rent of building, Department of Justice, 1881:		
Appropriation, act of June 15, 1880	$10,000 00	
Payments during fiscal year	10,000 00	
Salary of warden of jail, 1881:		
Appropriation, act June 15, 1880	1,800 00	
Payments during fiscal year	1,800 00	
Balance of appropriation, support of convicts, 1879:		
Balance July 1, 1880	3,680 20	
Payment in fiscal year	1,305 00	
Balance July 1, 1881		$2,375 20
Balance of appropriation, support of convicts, 1880:		
Balance July 1, 1880	9,795 23	
Payments during fiscal year	1,442 24	
Balance July 1, 1881		8,352 99
Support of convicts, 1881:		
Appropriation, act June 16, 1880	25,000 00	
Payments during fiscal year	1,285 24	
Balance July 1, 1881		23,714 76
Balance of appropriation for defending suits and claims for seizure of captured or abandoned property, 1879:		
Balance of appropriation July 1, 1880	2,118 39	
Payments during fiscal year	250 00	
Balance to surplus fund July 1, 1881		1,868 39
Balance of appropriation for defending suits and claims for seizure of captured or abandoned property, 1880:		
Balance of appropriation July 1, 1880	271 42	
Payment during fiscal year	165 00	
Balance July 1, 1881		106 42
Defending suits and claims against the United States, 1881:		
Appropriation, act June 16, 1880	25,000 00	
Payment during fiscal year	24,578 50	
Balance July 1, 1881		421 50
Punishing violations of intercourse acts and frauds, 1880:		
Balance July 1, 1880	94,24	
Payment in fiscal year	20 00	
Balance July 1, 1881		74 24
Punishing violations of intercourse acts and frauds, 1881:		
Appropriation, act June 16, 1880	5,000 00	
Payments during fiscal year	4,792 15	
Balance July 1, 1881		207 85
Prosecution of crimes, 1879:		
Balance July 1, 1880	2,278 44	
Payment during fiscal year	130 00	
Balance July 1, 1881, to surplus fund		2,148 44
Prosecution of crimes, 1880:		
Balance July 1, 1880	5,877 30	
Payments during fiscal year	1,357 74	
Balance July 1, 1881		4,519 56
Prosecution of crimes, 1881:		
Appropriation, act June 16, 1880	20,000 00	
Repayment during fiscal year	1,000 00	
	21,000 00	
Payments during the fiscal year	19,974 91	
Balance July 1, 1881		1,025 09

Balance of reappropriation, court-house, Washington, D. C., 1880:		
Balance July 1, 1880	$500 00	
Payments during fiscal year	500 00	
Court house, Washington, D. C., 1881:		
Appropriation, act June 16, 1880	1,000 00	
Payments during fiscal year	1,000 00	
Expenses of territorial courts in Utah, 1875 and 1876, (for relief of George R. Maxwell, late marshal):		
Balance of appropriation July, 1880	11,549 27	
Payments during fiscal year	6,617 50	
Balance to surplus fund July 1, 1881		$4,931 77
Reappropriation, expenses of territorial courts in Utah, 1877:		
Appropriation, act June 16, 1880	1,349 95	
Payment in fiscal year	1,349 95	
Expenses of territorial courts in Utah, 1878, and prior years:		
Appropriation, act March 3, 1881	1,037 98	
Payments during fiscal year	1,037 98	
Balance of reapropriation, expenses of territorial courts in Utah, 1879:		
Balance July 1, 1880	125 26	
Deficiency appropriation, act March 3, 1881	1,623 73	
	1,748 99	
Payment in fiscal year	1,623 73	
Balance to surplus fund July 1, 1881		125 26
Balance of reappropriation, expenses of territorial courts in Utah, 1880:		
Balance July 1, 1880	2,716 75	
Payments during fiscal year	2,716 75	
Expenses of territorial courts in Utah, 1881:		
Appropriation, act June 16, 1880	20,000 00	
Payments during fiscal year	20,000 00	
Expenses of United States courts in Utah, 1880:		
Appropriation, act March 3, 1881	4,000 00	
Payment during fiscal year	197 55	
Balance July 1, 1881		3,802 45
Prosecution and collection of claims, 1879:		
Balance July 1, 1880	586 00	
Payment during fiscal year	250 00	
Balance to surplus fund July 1, 1881		336 00
Prosecution and collection of claims, 1880:		
Balance July 1, 1880	1,450 00	
Payments during fiscal year	1,280 00	
Balance July 1, 1881		170 00
Prosecution and collection of claims, 1881:		
Appropriation, act June 16, 1880	2,500 00	
Payment in fiscal year	150 00	
Balance July 1, 1880		2,350 00
Furniture and repairs, United States court-house, Charleston, S. C., 1881:		
Appropriation, act June 16, 1880	2,500 00	
Payments during fiscal year	2,057 80	
Balance July 1, 1881		442 20

Relief of John H. Standish, late United States attorney:		
Appropriation, act June 16, 1880	$225 00	
Payment during fiscal year	225 00	
Law library of Territory of Wyoming:		
Appropriation, act June 16, 1880	1,500 00	
Payment in fiscal year	1,476 00	
Balance July 1, 1881		$24 00
Law-books, United States courts, Deadwood, Dak., 1881:		
Appropriation, act June 16, 1880	423 00	
Payment in fiscal year	392 00	
Balance July 1, 1881		31 00
Payments to supervisors of elections, 1881		234,242 10
Contingent expenses, Department of Justice, viz:		
Furniture and repairs, 1881:		
Appropriation, act June 15, 1880	1,000 00	
Payments during fiscal year	946 40	
Balance July 1, 1881		53 60
Books for department library, 1881:		
Appropriation, act June 15, 1880	1,500 00	
Payments during fiscal year	1,498 25	
Balance July 1, 1881		1 75
Books for the office of the Solicitor, 1881:		
Appropriation, act of June 15, 1880	500 00	
Payments during fiscal year	495 40	
Balance July 1, 1881		4 60
Stationery, 1881:		
Appropriation, act of June 15, 1880	1,500 00	
Payments during fiscal year	1,491 50	
Balance July 1, 1881		8 50
Horses and wagons, 1881:		
Appropriation, act of June 15, 1880	1,200 00	
Payments during fiscal year	922 09	
Balance July 1, 1881		277 91
Miscellaneous items, 1881:		
Appropriation, act of June 15, 1880	6,000 00	
Payments during fiscal year	5,885 80	
Balance July 1, 1881		114 00

EXHIBIT G.—*Statement showing items, amounts, causes of expenditures, and persons paid from contingent fund, for the fiscal year ending June* 30, 1881.

1880.			
	Washington and Georgetown Railroad Company:		
July 17.	Fare tickets		$10 00
	W. C. Chase:		
8.	1 year's subscription to "Free Lance"		1 50
	J. G. Weaver:		
9.	Walnut box for papers		10 00
	J. G. Weaver:		
9.	Cleaning carpet, $2, putting down carpet, $2	$4 00	
	Hooks on doors	50	
			4 50

	James Talty:		
17.	Repairing 5 wash basin faucets and one wash-basin	$4 50	
	Arranging pipes so as to have water from the tank in Attorney-General's and chief clerk's rooms	15 00	
	2 stop faucets, at $3.50, two lock nuts, 30 cents	3 80	
	2 sockets, 30 cents, arranging pipes so as to have water from tank to rooms 4, 7, and 8	18 00	
			$41 60
	W. S. Mitchell:		
17.	75 yards fancy matting, at 53 cents a yard	39 75	
	60½ yards fancy matting, at 53 cents a yard	32 07	
	17 yards fancy matting, at 53 cents a yard	9 01	
	15 yards oil-cloth, at $1.25	18 75	
			99 58
	W. S. Thompson:		
22.	Brush and comb, $2.75; benzine, 15 cents		2 90
	F. A. Fill & Co.:		
23.	9 months' subscription Washington Star, April 1 to December 31.		6 75
	Adams Express Company:		
23.	For freight charges on the following: Four packages from Boston	6 75	
	1 package from Philadelphia, 40 cents; 2 packages from Baltimore, 50 cents	90	
	1 package from Columbia, S. C	75	
			8 40
	H. Coleman:		
25.	Washing, scrubbing paint, and cleaning windows and shades		35 00
	Metropolitan Railroad Company:		
28.	240 car tickets, at 4⅙ cents		10 00
	Charles H. Lee:		
31.	Salary as driver department carriage month July, 1880		70 80
	Mary Harrison:		
31.	Washing for office during July, 1880, 12½ dozen towels, at 50 cents (Solicitor Treasury's office)		6 25
	Margaret Linkins:		
31.	Sweeping and cleaning office during July, 1880 (Solicitor Treasury's office)		20 00
1880.			
	James T. Brown:		
July 31.	1 black silk lithograph ribbon for type-writer		1 50
	James Talty:		
Aug. 2.	1 extension gas-lighter, 1 globe, 1 globe-holder, 1 burner, and repairing and cleaning out main hall light		7 50
	T. Simms:		
5.	5 days work in Library Document Room, at $2		10 00
	Washington and Georgetown Railroad Company:		
	Fare tickets		10 00
	John Robertson:		
	Hauling 1 load of books to post-office		1 50
	Herman Baumgarten:		
	1 penalty stamp of seal	8 00	
	1 fac simile	8 00	
	1 dating stamp	12 00	
	Repairs to penalty stamp	1 00	
			29 00
	Boston Daily Advertiser:		
	Subscription from April 6, 1879, to April 6, 1881		24 00
	New York Times:		
4.	12 months subscription for daily, July 4, 1880 (Solicitor of Treasury's office)		12 00
	New York Herald:		
	12 months subscription to daily, July 3, 1880 (Solicitor of Treasury's office)		10 00
	National Republican Printing and Publishing Company:		
10.	Notice, 6½ squares, 3 weeks		22 75

		Washington Gas-light Company:		
		Gas from July 1 to August 1, 1880, 5,200 feet, at $2.25 ...	$11 70	
		Discount 25 cents per 1,000 feet	1 30	
				$10 40
		Western Union Telegraph Company:		
July	2.	Telegraphing for Solicitor Treasury's office, for July, 1880		5 70
		Adams' Express Company:		
	9.	Freight charges transportation of government property		1 45
		J. M. O'Meara:		
	3.	One horse knife with lancet		2 00
		Metropolitan Railroad Company:		
	11.	240 car tickets		10 00
1880.				
		N. W. Burchell:		
July	3.	1 brush, 90c; duster, 30c; 1 duster, $1.25; 1 duster, $2.50,	4 95	
		1 whisp, 30c; 6 doz. matches, @ 25c, 1.50 (Solicitor of the Treasury's office)	1 80	
				6 75
		J. G. Weaver:		
	16.	Making one walnut file case	110 00	
				110 00
		Western Union Telegraph Company:		
	1.	Telegraphing for office of Attorney-General for month of July		86 20
		H. H. Hempler:		
	8.	1 Thermometer, $1.50	1 50	
		2 Storm glasses, at $1.00	2 00	
				3 50
		Western Union Telegraph Company:		
	9.	Telegraphing for office Solicitor of the Treasury		1 38
		National Capital Telephone Company:		
		Telephone exchange service and rental of apparatus from July 1, 1880, to June 30, 1881		46 00
		Herman Baumgarten:		
Aug.	28.	One seal and press		15 00
		E. W. Woodruff:		
		$10\frac{2}{3}$ doz. file holders, $10\frac{1}{4}$ x $4\frac{5}{8}$ x $12\frac{1}{8}$ at $12	128 00	
		1 doz $9\frac{3}{8}$ x $4\frac{1}{4}$ x $10\frac{1}{2}$ at $10	10 00	
				138 00
		C. H. Lee:		
		Salary as driver of department carriage for month of August		70 80
		A. R. Moxley:		
	28.	Carting pamphlets from department to G street		50
	31.	Washington and Georgetown Railroad Company Car tickets ..		10 00
		Margaret Linkins:		
	do.	Cleaning and sweeping office of the Solicitor of the Treasury for August		20 00
		Mary Harrison:		
	do.	Washing $11\frac{1}{2}$ dozen towels at 50c. (Solicitor of the Treasury's office)		5 75
		Baltimore and Ohio Express Company:		
August	13.	Express charges on package to Winchester, Va	25	
	17.	Express charges on package from Winchester, Va	25	
	25.	Express charges on package to Winchester, Va	25	
	28.	Express charges on package from Winchester, Va	25	
	30.	Express charges on package to Winchester, Va	25	
				1 25
		Baltimore and Ohio and American Union Telegraph Co:		
	17.	Telegrams, Attorney-General's office		128
1880.				
		Western Union Telegraph Company:		
		Telegraphing for office of Attorney-General for August, 1880		89 62
		Washington Gas-light Company:		
Sept.	7.	5,400 feet, at $2.25 per 1,000 feet	12 15	
		Less discount	1 35	
				10 80
		Western Union Telegraph Company:		
Aug.	2.	Telegraphing for office of Solicitor of the Treasury		6 81

		John H. Taylor:		
Sept.	17.	4 days' work, washing windows and paint and cleaning grates, at $1.50		$6 00
		Penrose Thomas:		
	20.	30 pieces polish for windows		2 00
		D. E. W. Carter:		
	20.	3 dozen towels, at $3		9 00
		Washington and Georgetown Railroad Company:		
		Car tickets		10 00
		Margaret Linkins:		
		Sweeping and cleaning office of Solicitor of Treasury for September		20 00
		Mary Harrison:		
	30.	Washing 10 dozen towels, at 50c. (Sol. Treasury's Office)		5 00
		John H. Magruder:		
July	2.	½ dozen brooms, $3; 1 ice-bucket, $1; 1 pick, 50		$4 50
	8.	2 dozen matches, at 25c., 50; 5½ gross glycerine soap, $7.25; ½ gross Eld. F soap, $7.75	$15 00	
		1 gross oatmeal soap, $18	18 00	
			33 00	
		Less 5 per cent	1 65	
				31 35
Aug.	25.	2 dozen matches, at 25, 50; (27) 4 sponges, $2.08		2 58
		2 brushes, at 25, 50; (Sept. 6) 2 sponges, at 30c., 60		1 10
		2 stove brushes, at 25, 50; (20) 2 dozen matches, at 25c., 50		50
				50
				41 03
		Chas. H. Lee:		
Sept.	30.	Salary as driver department carriage for month of September		68 40
		Henry Coleman:		
	30.	Washing towels for quarter ending Sept. 30		36 00
		T. M. Simms:		
Oct.	1.	Services as extra night watchman (voucher 59)		20 00
		Ludner & Ladson:		
	1.	Eight-day striking imitation marble clock		11 50
Sept.	—.	American Union and Baltimore and Ohio Telegraph Company:		
		Telegraphing for office of Attorney-General for September		4 81
Oct.	2.	S. J. Haislett:		
		Taking 38 awnings down, at 10 cents		3 80
	2.	S. A. Harris:		
		10 copies back numbers New York papers		50
Sept.	3.	J. G. Weaver:		
		Fitting lock, 50 cents; (14) fitting lock, $1.50; 1 shelf, $1.50	3 50	
		Putting down oilcloth, $1.50; fitting key and lock, 50 cents	2 00	
		Hanging 4 doors, $3; fitting 5 locks, 75 cents	3 75	
		Putting down 18 carpets, at $3	54 00	
		Telegraph board	1 00	
Oct.	2.	2 book pockets	2 00	
				66 25
Sept.	18.	J. G. Weaver:		
		Fixing locks on desk, $1.25	1 25	
	30.	Making 10 shelves and altering cases for files	5 50	
		Taking up and cleaning 4 carpets, at $3	12 00	
		Putting down 4 carpets, at $3	12 00	
				30 75
		(Solicitor of Treasury's Office.)		
		Great Falls Ice Company:		
July	31.	3,675 lbs. of ice, at 50 cents, $18.38; (Aug. 31) 3,450 lbs. at 50 cents, $17.25	35 63	
Sept.	30.	3,450 lbs. of ice, at 50 cents	17 25	
				52 88

		Adams Express Company:		
Aug.	13.	Freight charges, &c., bundle from Boston	$0 80	
		Freight charges, &c., bundle from Boston	25	
				$1 05
		Washington Gas-light Company:		
		Gas from Sept. 1, '80, to Oct. 1, 1880, 7,700 feet, at $2.25 per 1,000 feet	17 33	
		Discount 25 cents per 1,000 feet	1 93	
				15 40
		Henderson Winfield:		
Oct.	7.	Sawing and stowing half cord wood		1 00
		Western Union Telegraph Company:		
Sept.	1.	Telegraphing for office of Attorney-General for September, 1880.		74 84
		M. E. Dante:		
Oct.	9.	Furnishing fire-brick, mortar, fire-clay, casing two fireplaces and laying three hearths with fire-brick in rooms 4, 5, and 7		22 50
		George Ferguson:		
	12.	Labor removing books to library floor		50
		John Burton:		
	11.	Labor removing books to library floor		50
		Metropolitan Railroad Company:		
	14.	240 car tickets, at $4\frac{1}{6}$ cents		10 00
		George Ferguson:		
	14.	To hauling books to Supreme Courts of United States and District of Columbia		50
		National Republican:		
	15.	Daily Republican, June 1 to September 30 (Solicitor of the Treasury's Office)		2 00
		Henderson Winfield:		
	16.	Labor in sawing and stowing $\frac{1}{2}$ cord wood		1 00
		George Sanford:		
	19.	Repairs to bell		1 75
		John N. Taylor:		
		Cleaning passage; putting up and cleaning stove		1 50
		Wm. S. Mitchell:		
Sept.	15.	$7\frac{1}{2}$ yards oilcloth, at $1.25	8 90	
	30.	244 yards Brussels, at 1.75	427 00	
Oct.	15.	12 yards Brussels, at 1.75	21 00	
				456 90
		J. G. Weaver:		
		Sewing and putting down 244 yards carpet, at 10 cents	24 40	
		Making over 3 carpets and putting down, $11.50	11 50	
		Making rugs for chairs, $1.50; taking up	1 50	
		Putting down matting, $3.50; jobbing $2\frac{1}{2}$ hours, at 50 cents	4 75	
		Fixing window ropes	3 00	
				45 15
		George Ferguson:		
	21.	Hauling one load pamphlet laws to city post-office		2 00
		M. W. Beveridge:		
	23.	One fire set and stand	4 75	
		1 blower stand	60	
				5 35
	22.	W. H. Williams:		
		Labor sawing and stowing $\frac{1}{2}$ cord of wood		1 00
		Western Union Telegraph Company:		
	25.	Telegraphing for Solicitor's Office		4 69
		Henry Brooks:		
		5 cords of wood, at $5		25 00
		W. H. Williams:		
	27.	Labor sawing and stowing $\frac{1}{2}$ cord wood		1 00
		George Ferguson:		
	26.	Hauling one load United States Supreme Court Reports, 11 Otto.		1 50
		A. M. Brooks & Co.:		
Aug.	26.	4 mouse traps		1 00

		James Talty:		
Sept.	4.	2 lava tip burners, at 25 cents	$0 50	
Oct.	27.	4 opal globes, at 50 cents	2 00	
		4 globe holders, at 15 cents 60c.; 1 argand shade holder, 50 cents	1 10	
		16 lava tip burners, at 25 cents	4 00	
		Repairing sink faucet and gas fixtures	3 00	
				$10 60
		S. A. Harris:		
	28.	7 copies back numbers New York papers for Department of Justice		35
		Charles H. Lee:		
	31	Salary as driver department carriage for October		70 80
		Washington and Georgetown Railroad Company:		
Nov.	6.	Fare tickets		10 00
		J. G. Weaver:		
	6.	Making and putting up 4 spring roller shades, at $2.75		11 00
		Robert Wheeler:		
	8.	Labor sawing and stowing ½ cord wood		1 00
		Baltimore & Ohio & American Union Telegraph Company:		
		Telegraphing for office of Attorney-General for October, 1880		17 08
1880.		M. W. Beveridge:		
Nov.	9.	2 decorated gas shades	5 50	
		⅓ dozen white gas shades	1 67	
				7 17
		Western Union Telegraph Company:		
		Telegraphing for office of Attorney-General for October		150 36
		Washington Gas-Light Company:		
		Gas from October 1, 1880, to November 1, 1880, 11,000 feet at $2.25 per 1,000	24 75	
		Discount 25 cents per 1,000 feet	2 75	
				22 00
		William Williams:		
		Labor sawing and stowing ½ cord wood		1 00
		Margaret Linkins:		
		Sweeping and cleaning the office of Solicitor of the Treasury, for October, 1880		20 00
		Mary Harrison:		
		Washing 10 dozen towels, at 50 cents (Solicitor of the Treasury's office)		5 00
		National Republican Publishing and Printing Company:		
		Subscription from October 1, 1880, to October 1, 1881		6 00
		William Williams:		
	13.	Splitting and stowing ½ cord wood		1 25
		James Temple Brown:		
Oct.	18.	Repairing, cleaning, and adjusting type-writer		2 50
		James Talty:		
Nov.	10.	Taking down and putting up urinal, cleaning out waste pipe of urinal, repairing water-closet, slop and basin faucets		7 50
		Henry Brooks:		
	13.	4 cords hard wood, at $5.00	20 00	
		1 cord pine wood, at $4.75	4 75	
				24 75
		National Republican Publishing and Printing Company:		
	13.	Subscription from October 1, 1880, to October 1, 1881, two copies.		12 00
		Coleman Horner:		
	15.	Labor removing books to library floor		1 50
		L. H. Schneider & Co.:		
	17.	1 claw hammer	0 45	
		2 screw-drivers	0 65	
		1 gimlet	0 10	
				1 20
1880.		John Robertson:		
Nov.	17.	Delivering books to the departments and United States courts in Washington, D. C		2 00

		Coleman Horner:		
	16.	Delivery of books to third floor		$1 25
		William Williams:		
	22.	Labor sawing and stowing ½ cord wood		1 00
		Washington and Georgetown Railroad Company:		
	22.	Fare tickets		10 00
		Conrad Becker:		
Oct.	5.	1 whip, $3 (6) 1 heavy weight strap, $1.50	$4 50	
		1 fine wool robe	15 50	
Nov.	11.	1 green horse cover	13 50	
		1 plain brown horse cover	9 75	
		2 square stable blankets	13 50	
		1 fine lap robe	10 00	
				66 75
		John Taylor:		
	14.	Stowing away awnings, lamp globes, grates, and stove pipes in the upper floor		1 00
		J. G. Weaver:		
	27.	Fastening door	2 00	
		Fixing 2 windows and ropes, $3; making one ventilator, $3.75	6 75	
				8 75
		William Williams:		
	24.	Labor sawing and stowing ½ cord wood		1 00
		John Robinson:		
		Hauling one load of books to post-office		1 5
		Charles H. Lee:		
		Salary as driver department carriage, &c., for November, 1880		68 40
		M. W. Galt & Bro.:		
		Repairing ice pitcher (Solicitor of Treasury's office)		50
		William Williams:		
	30.	Labor sawing and stowing ½ cord wood		1 00
		Mary Harrison:		
		Washing 12 dozen towels, 50 cents (November) Solicitor of Treasury's office)		6 00
		Margaret Linkins:		
		Sweeping and cleaning office (November) Solicitor of Treasury's office		20 00
		D. Rickenbacker:		
		Repairing ice pitcher		50
1880.		William Williams:		
Dec.	2.	Sawing and cutting ½ cord wood		1 00
		James Talty:		
		Ventilating water-closets on first, second, and third floors as agreed	45 00	
		Taking down slop sinks and capping up waste pipes of same	3 00	
		2 patent traps for sinks, $5; 30 pounds lead waste pipe for sinks and basin, $4.50	9 50	
		8 pounds solder, $2.40; 11½ feet galvanized water pipe, $2.30	4 70	
		9 galvanized fittings	1 35	
		1 finished faucet for sink	1 50	
		4 sink legs, $5; 15½ feet gas pipe, $2.32	7 32	
		2 fittings, 20 cents; 2 gas fixtures, $3	3 20	
		Plumber and assistant, time setting sinks, making connections to wash-basins, running water pipes, cleaning out waste pipe of wash-basin, &c	24 00	
		Hanging gas fixtures, extending gas pipe, and repairing leaks in Attorney-General's chandelier	6 00	
		Gas stove, $9; 12 feet large and best tubing, $3	12 00	
		16 feet pipe for gas stove, including damper	2 40	
		1 gas valve, $1.25; 3 nipples, 45 cents; 1 fitting, 10 cents	1 80	
		8 feet best gas tubing, including gum ferrule and fitting same	4 50	

	Fitting valve pipe and cutting window-pane for gas stove	$1 50	
	2 elbows for gas stove	30	
	Material and time of plasterer and helper plastering and painting up closet on first floor	6 00	
			$134 07
	Western Union Telegraph Company:		
	Telegraphing for office Solicitor of Treasury—October		4 20
	William Williams:		
Dec. 4.	Cutting and sawing ½ cord wood		1 00
	Columbia Railroad Company:		
7.	240 car tickets at 4⅙ cents		10 00
	Daniel Scott:		
7.	Labor hauling coal		1 00
	Western Union Telegraph Company:		
	Telegraphing for office of Attorney-General for November		194 60
	Baltimore and Ohio American Union Telegraph Company:		
	Telegraphing for office of Attorney-General for November		28 32
	William Williams:		
7.	Labor sawing 1 cord wood	2 00	
	Splitting ½ cord wood	25	
			2 25
	Washington Gas-Light Company:		
	16,600 feet at $2.25, from November 1, 1880, to December 1, 1880	37 35	
	Discount 25 cents per 1,000 feet	4 15	
			33 20
	Henry Brooks:		
9.	6 cords oak wood, at $5	30 00	
	½ cord pine wood, at $4.75	2 38	
			32 38
	William Williams:		
10.	Labor sawing one cord wood and stowing same		1 00
	M. W. Beveridge:		
	1 dec. cuspadore		2 50
	William Williams:		
13.	Labor sawing and stowing 1 cord wood		2 00
	The Evening Mail (N. Y.):		
	Subscription to "Daily" from December 10, 1880, to December 10, 1881		6 00
	J. H. Klopfer:		
	5 days' work, on library floor, at $1.50		7 50
	Wm. E. Dante:		
	Curing smoking fire-place in room No. 5		6 25
	Horace Haight:		
18.	Painting, graining, and kalsomining 3 closets, at $25	75 00	
	Painting 1 pair steps	5 00	
			80 00
	Tyssowski Bros.:		
	2 pairs gloves for driver of department carriage		5 50
	Margaret Linkins:		
	Sweeping and cleaning office for the month of December 1880 (Solicitor Treasury's office)		20 00
	William Williams:		
22.	Labor sawing and stowing 1 cord wood		2 00
	J. G. Weaver:		
24.	3 ventilators		12 25
	Henry Coleman:		
31.	Washing towels for the quarter ending 31st December, 1880		36 00
	Charles H. Lee:		
	Salary as driver department carriage, &c., for December, 1880		70 80
	John H. Taylor:		
24.	Removing rubbish, cleaning floors, grates, washing windows, bringing boxes from Treasury to pack books, &c, 3½ days, at $1.50 per day		5 25

		John B. Sweat:		
		Labor and service performed, under direction of the Department of Justice, from November 22, 1880, to December 24, 1880.....		$75 00
		Columbia Railroad Company:		
27.		240 car tickets, at 4⅙ cents.....		10 00
		John H. Taylor:		
27.		Labor filling box on third story with coal.....		1 00
		Western Union Telegraph Company:		
		Telegraphing for office of Solicitor of the Treasury for November.		6 30
		F. A. Fill & Co.:		
		3 subscriptions for Washington Star from January 1 to March 31, 1880.....		2 25
		Jessie H. Klopfer:		
		12 days' work in the department, at $1.50 per day.....		18 00
		Mary Harrison:		
		Washing 9½ dozen towels, at 50 cents per dozen (Solicitor Treasury's office).....		4 75
1881.		William H. Williams:		
Jan. —.		Labor sawing and splitting ½ cord wood, and stowing...	1 25	
		Labor sawing and stowing ½ cord oak.....	1 00	
				2 25
		John H. Taylor:		
		Labor cleaning away snow.....		75
		Washington Gas-Light Company:		
		Gas from December 1, 1880, to January 1, 1881, 20,400 feet, at $2.25 per 1,000 feet.....	45 90	
		Deduct 25 cents per 1,000 feet.....	5 10	
				40 80
		Washington City Post-Office:		
		Postage on letters from July 1 to December 31, 1880.....		94
		Judd & Detweiler:		
		30 Brief No. 80, Clark vs. United States, 3 pages.....	3 75	
		30 Brief No. 168, Folger vs. United States, 1 page.....	1 25	
				5 00
1880.		Woodward, Lothrop & Cochrane:		
Dec.	24.	236¾ yards cambric, at 6¾ cents.....		15 98
1881.		William H. Wilson:		
Jan.	6.	Carting desk to Department of Justice.....		1 25
1880.		Royce & Marean:		
Dec.	7.	1 cell, Leclanche battery (Disque).....		2 00
1880.		J. W. Boteler & Son:		
July	1.	1 doz. tumblers.....		1 00
1881.		William H. Williams:		
Jan.	6.	Sawing and stowing 1 cord wood.....		2 00
1880.		Conrad Becker:		
Nov.	24.	Carriage mat.....		5 50
		E. L. Weaver:		
Dec.	27.	Draping building, $10; lumber, $7.30.....	17 30	
		Hanging map.....	1 00	
				18 30
1881.		John H. Taylor:		
Jan.	4.	Cleaning snow off pavement, &c.....	50	
	5.	Cleaning snow and moving reports and carrying desk to upper floor, occupying 1 day.....	1 50	
	7.	Carrying books to upper floor.....	50	
				2 50
1880.		Great Falls Ice Co.:		
Oct.	31.	3,510 pounds ice.....	17 55	
Nov.	30.	3,350 pounds ice.....	16 75	
Dec.	30.	3,525 pounds ice.....	17 63	
				51 93
		W. S. Thompson:		
Oct.	6.	1 quart alcohol and bottle, 85 cents.....	85	
	19.	Two hair brushes.....	4 65	
	19.	3 combs.....	1 90	
				7 40

		Western Union Telegraph Company:		
Dec.	1.	Telegraphing for Attorney-General's office for Dec. 1880		$144 06
1881.		Columbia Railroad Company:		
Jan.	13.	240 car tickets		10 00
		William H, Williams:		
	14.	Cutting and stowing 1 cord wood		2 00
		Baltimore and Potomac Railroad Company:		
	6.	Freight from Jersey City, 1 case books	$0 51	
		Charges, 45 cents and 25 cents	70	
				1 21
		Herman Baumgarten:		
		Furnishing 40 file tags	10 00	
		J. H. Klopfer:		
Jan.	15.	6 days' work, at $1.50 per day	9 00	
		John H. Taylor:		
	7.	Labor taking up, cleaning, and putting down carpet	3 50	
	8.	Carrying coal to first floor	50	
	10.	Cleaning off snow and opening gutter	75	
		Carrying coal to upper floor of building	1 00	
				5 75
		William H. Williams:		
"	15.	Cutting and stowing ½ cord wood		1 00
		Henry Brooks:		
	17.	10 cords oak and hickory wood, at $6		60 00
		William H. Williams:		
	18.	Cutting and stowing 1 cord of wood		2 00
		E. H. Smith:		
		Putting up 100 feet speaking-tube	20 00	
		6 whistles	6 00	
				26 00
		The National Capital Telephone Company:		
	13.	Moving telephone to opposite of room, Freedman's Bank Building.		6 80
1880.		The American Union Telegraph Company:		
Dec.	7.	Telegram for office Solicitor of Treasury		76
1881.		William H. Williams:		
Jan.	21.	Cutting and stowing ½ cord of wood		1 00
		John H. Taylor:		
	20, 21.	Carrying water and cleaning closet during repairs to water tank		1 50
1880.		Adams Express Company:		
Nov.	—.	Freight charges for transportation of government property for November, 1880		10 50
1881.		Amstead Wesley:		
Jan.	25.	6 cords oak wood, at $5		30 00
		William H. Williams:		
	26.	Cutting and stowing ½ cord wood		1 00
		Columbia Railroad Company:		
	27.	240 car tickets		10 00
		John H. Taylor:		
	31.	Washing windows		2 00
		Chas. H. Lee:		
	31.	Salary as driver department carriage for month of January, 1881.		72 30
		William H. Williams:		
	29.	Cutting and stowing ½ cord pine wood	1 25	
		Cutting and stowing ½ cord oak wood	1 00	
				2 25
		Lewis J. Gill:		
		Repairing mail bag and putting same in order		2 25
		Geo. Kraft, agent:		
	31.	Subscription Daily Republican October 1 to January 31, 1881		2 00
		Tyssowski Bros.:		
Feb.	1.	1 muffler for driver department carriage		4 25
		James Talty:		
Jan.	22.	Material, and disconnecting and capping supply pipes of 4 closets, 2 urinals, 1 slop sink, and sealing the waste pipes of 4 closets, 2 urinals, and 1 slop sink, &c		10 00

		John H. Taylor:		
Feb.	1.	Carrying coal to upper floor	$1 00	
		Cleaning snow from sidewalk	50	
				$1 50
		Margaret Linkins:		
		Sweeping and cleaning for January, 1881 (Solicitor of Treasury's office)		20 00
		Mary Harrison:		
		Washing 9½ dozen towels, at 50 cents a dozen (Solicitor of Treasury's office)		4 75
		Leadingham & Co.:		
		Use of horse, owing to lameness of horse (Department)		6 00
1880.		John H. Magruder:		
Sept.	28.	1 dozen tapers, $2.50; (Oct. 22,) 4 dusters, $2; 1 dozen whisks, $3.30	7 80	
		1 dust pan, 30 cents; (October 28,) 2 dozen matches, 50 cents	80	
Nov.	6.	1 duster, $2.75; 1 hair duster, 40 cents	3 15	
	23.	4 coal hods, 2 at 75 cents, 2 at 65 cents, $2.80; (26,) 2 dozen matches, $1.20	4 00	
Dec.	2.	1 bucket, 75 cents; 1 bucket, $1; (3) 1 duster, $2.50	4 25	
	30.	1 shovel	1 25	
				21 25
1881.		E. F. Simpson:		
Jan.	4.	1 10 5th Avenue stove	22 00	
		1 zinc board, $2.50; 1 M. G. hod, $1.25	3 75	
		Cut hole in wall and put up with 4½ joints pipe, elbow, galvanized joint and cap	8 75	
	24.	Put up on the outside 21½ joints galvanized-iron pipe, 3 elbows and ventilating cap, with bands and stays	25 00	
				59 50
		Washington Gas-Light Company:		
		Gas consumed from January 1, 1881, to February 1, 1881, 18,000 feet, at $2.25 per 1,000 feet	42 30	
		Discount, 25 cents per 1,000 feet	4 70	
				37 60
1880.		Western Union Telegraph Company:		
Dec.		Telegraphing for office Solicitor of Treasury for December		7 19
1881.		William H. Williams:		
Feb.	5.	Sawing and stowing 1 cord wood	2 00	
		Sawing and stowing ½ cord wood	1 25	
				3 25
		Wm. S. Mitchell:		
		1 Smyrna rug		9 00
		Wm. S. Mitchell:		
		8 yards Brussels carpet, at $1.75	14 00	
		Sewing Brussels carpet, at 5 cents per yard	40	
				14 40
		Western Union Telegraph Company:		
		Telegraphing for office of Attorney-General for January		13 41
		E. W. Woodruff:		
		2 dozen file holders, walnut fronts, size 9½ × 4⅜ × 11¼, at $10		20
		Western Union Telegraph Company:		
		Telegraphing for office of Attorney-General for January		20 73
		John L. Ginck:		
		25 copies Washington Law Reporter February 2, 1881		2 50
		William H. Williams:		
	11.	Sawing and stowing ½ cord wood		1 00
		James Fitzpatrick:		
		Cutting wall and setting in one joint of new 5-inch pipe in small front room, bricklayers 3 days, $3, $9; laborer 3 days, $1.50, $4.50; plasterers 1 day, $3	16 50	
		Laborers 1 day, $1.50; 1 joint 5-inch cast iron pipe, $1.75.	3 25	
		Mortar, cement, and brick	4 00	
				23 75
		American Union Telegraph Company:		
		Telegraphing for office of Attorney-General for December, 1880		8 28

1881.		Columbia Railroad Company:		
Feb.	15.	240 car tickets		$10 00
		John H. Taylor:		
	2.	Cleaning off snow	50	
	14.	Cleaning carpet	50	
		Bringing coal up on first floor	2 00	
				3 00
		Joseph Williams:		
	18.	Hauling one load of reports to the post-office		50
		J. G. Weaver:		
Jan.	11.	Fixing doors, $1; door lock, 50 cents	1 50	
	24.	Shade, 50 cents; taking down drapery, $3	3 50	
Feb.	18.	Fitting key in door	1 00	
				6 00
		William H. Williams:		
	24.	To cutting and storing ½ cord wood		1 00
		Henry Brooks:		
	28.	11½ cords oak wood, at $6	69 00	
		1 cord pine wood, at $4.75	4 75	
				73 75
		Mary Harrison:		
		Washing 15 dozen towels, at 50 cents per dozen		7 50
		(Solicitor Treasury's Office.)		
		Charles H. Lee:		
		Salary as driver department carriage for February, 1881		65 40
		Margaret Linkins:		
		Sweeping and cleaning office of Solicitor of the Treasury for the month of February, 1881		20 00
		William H. Williams:		
Mar.	1.	Cutting and stowing ½ cord wood		1 00
		Western Union Telegraph Company:		
Jan.		Telegraphing for office of Solicitor of the Treasury for January, 1881		1 62
		William H. Williams:		
Mar.	3.	Cutting and splitting ½ cord wood (pine)		1 25
		George Ferguson:		
		Hauling books to the post-office		50
		James Talty:		
Feb.	28.	Repairing Attorney-General's water-closet and cleaning out closet on same floor		3 00
		John H. Taylor:		
Mar.	1,2,3.	3 days' work washing windows and cleaning, at $1.50 per day		4 50
		Herdic Phæton Company:		
	7.	240 tickets		10 00
		Washington Gas Light Company:		
		Gas consumed from February 1, 1881, to March 1, 1881, 19,200 feet, at $2.25 per 1,000 feet	43 20	
		Discount, 25 cents	4 80	
				38 40
		M. E. Boardman:		
		½ dozen ivory folders		4 50
		James J. Chapman:		
Feb.	23.	6 binders for Congressional Record		6 00
		Western Union Telegraph Company:		
		Telegraphing for office of Attorney-General for February, 1881		71 47
		John H. Taylor:		
Mar.	5.	Work on third floor	1 00	
	7.	Filling coal box	1 00	
		Cleaning paint and globes in Attorney-General's room	1 50	
				3 50
		Adams Express Company:		
Jan. and Feb.		Freight charges for transportation of government property, January and February, 1881		3 45
		William H. Williams:		
Mar.	12.	Cutting and stowing 1 cord wood		2 00

		Conrad Becker:		
Jan.	27.	1 rubber coat		$6 50
		J. G. Weaver:		
Mar.	7.	15 flag holders, $15; 11 poles, $11		26 00
		J. G. Weaver:		
	4.	Decorating building		25 00
		Judd & Detweiler:		
		50 briefs, Philadelphia, Baltimore & Wilmington Railroad Company *vs.* United States, 3 pages		3 75
		American Union Telegraph Company:		
Feb.	—	Telegraphing for office of Attorney-General for February, 1881		6 91
		John H. Taylor:		
Mar.	10.	Washing windows and paint, and cleaning globes	$1 50	
		Cleaning water-closet	1 50	
				3 00
		William H. Williams:		
	21.	Cutting and splitting ½ cord wood		1 25
		John Robertson:		
	21.	Hauling books to the Executive Departments and Congressional Library		1 00
		Western Union Telegraph Company:		
Feb.	—	Telegraphing for office of Solicitor Treasury for February		4 61
		William H. Williams:		
Mar.	29.	Cutting and stowing ½ cord wood		1 00
		Chas. H. Lee:		
		Salary as driver department carriage, &c., for March, 1881		72 30
		Washington and Georgetown Railroad Company:		
	30.	240 car tickets		10 00
		Henry Coleman:		
	31.	Washing towels for the quarter ending March 31, 1881		36 00
		Margaret Linkins:		
		Sweeping and cleaning office of Solicitor Treasury March, 1881		20 00
		F. A. Fill:		
		3 months' subscription to Washington Star, April 1, to June 30, 1881		2 25
		Mary Harrison:		
		Washing 11 dozen towels, at 50 cents		5 50
1881.		James Talty:		
March	21.	Repairing closet and cleaning waste-pipe	3 00	
	26.	Repairing 2 closets and regulating supply to one	4 50	
				7 50
		J. G. Weaver:		
	16.	Moving furniture, $3.50	3 50	
		Fixing awning	50	
		Fixing window and ropes to same	1 50	
				5 50
		Washington City post-office:		
		Box-rent, postage on letters, &c., from January 1 to March 31, 1881		1 02
		W. B. Moses & Son:		
	3.	25 yards flagging, at 12½ cents per yard		3 13
		Washington Gas-Light Company:		
		Gas consumed from March 1, 1881, to April 1, 1881, 18,100 feet, at $2.25 per 1,000 feet	40 73	
		Discount 25 cents	4 53	
				36 20
		William H. Williams:		
April	2.	Cutting and stowing ½ cord wood	1 00	
				1 00
		John H. Taylor:		
March	30.	Labor, carrying books to library floor	1 00	
April	1.	Labor, carrying books to library floor	1 00	
				2 00

		Henry Brooks:		
April	4.	11 cords hard wood, at $6	$66 00	
		1 cord pine, at $4.75	4 75	
				$70 75
		Leadingham & Co.:		
March	11.	Use of horse (17 days) to 28th, both inclusive, at $2.50		42 50
		William H. Williams:		
April	5.	Cutting and stowing ½ cord wood		1 00
		The American Union Telegraph Company:		
March		Telegraphing for office of Attorney-General for March, 1881		3 02
		Great Falls Ice Company:		
Jan.	31.	3,150 pounds ice, 40 cents	12 60	
Feb.	28.	2,600 pounds ice	10 40	
March	31.	2,875 pounds ice	11 50	
				34 50
		Adams Express Company:		
		Charges for transportation of government property		1 85
		John Robertson:		
April	1.	Hauling one load of books to city post-office		1 50
		Western Union Telegraph Company:		
March		Telegraphing for office Solicitor of Treasury for March, 1881		28 18
		Telegraphing for office of Attorney-General for March, 1881		96 28
		William H. Williams:		
April	8.	Labor, cutting and stowing ½ cord of wood		1 00
		John H. Taylor:		
	6.	Cleaning fire-places, globes, and andirons		1 50
		Frank M'Laughlin (The Times, Philadelphia):		
		1 year's subscription to daily and Sunday editions, The Times		8 00
		W. L. M'Lean, treasurer The Press Company (limited):		
		Subscription daily and Sunday Press, Philadelphia, April 9, 1881, to April 9, 1882		10 75
		James Fitzpatrick:		
		Cleaning drain and sewer pipes in cellar of department building.		15 00
		Geo. Kraft:		
		Subscription Daily Republican February 1, 1881, to March 31, 1881 (Solicitor Treasury's office)		1 00
		Richard Bell:		
April	16.	Cutting and stowing ½ cord wood		1 00
		Francisco Crimbe:		
	22.	Repairing lock		1 00
		Amstead Wesley:		
	23.	4 cords oak wood at $5	20 00	
		½ cord pine wood at $4.75	2 38	
				22 38
		William H. Williams:		
	23.	Labor cutting and splitting ½ cord pine wood		1 25
		Washington and Georgetown Railroad Company: Fare tickets		5 00
		Charles H. Lee:		
	30.	Salary as driver department carriage, &c., for April, 1881		69 20
		Margaret Linkins:		
	30.	Sweeping and cleaning office Solicitor of Treasury for April, 1881		20
		Mary Harrison:		
	30.	Washing $12\frac{3}{1\,2}$ dozen towels, at 50 cents a dozen (Solicitor Treasury's office)		6 13
		The New York Times:		
		3 months' subscription to daily from May 1, 1881, to July 31, 1881		3 00
		"The World" (New York):		
		3 months' subscription to daily from April 30, 1881		3 00
		Washington Gas-Light Company:		
		Gas consumed from April 1, 1881 to May 1, 1881, 17,200 feet, at 2.25 per 1,000 ft	38 70	
		Discount, 25 cents per 1,000 feet	4 30	
				34 40

		Henry Brooks:		
May	5.	9 cords of oak wood at $6	$54 00	
		½ cord of pine wood at $4.75	2 38	
				$56 38
		Baltimore & Ohio Express:		
March	29.	Express charges on package from New York		60
		Geo. C. Maynard:		
		Repairing electric bells and renewing battery		2 25
		The American Union Telegraph Company:		
		Telegraphing for office of Attorney-General for April, 1881		3 00
		The Sun (New York):		
May	4.	Subscription to daily, one year, from May 4, 1881, to May 4, 1882.		6 50
		Adams Express Company:		
April	6.	Freight charges for transportation of government property		50
		Western Union Telegraph Company:		
April.		Telegraphing for office of Attorney-General for April		55 24
		Washington and Georgetown Railroad Company:		
		Fare tickets		5 00
		Western Union Telegraph Company:		
		Telegraphing for office of Solicitor of Treasury for April, 1881		5 35
		John H. Taylor:		
May	21.	Cleaning paint and washing windows		1 50
		Charles H. Lee:		
		Salary as driver department carriage, &c., for May, 1881		71 60
		F. J. Papst:		
		Subscription to the Daily National Republican from May 1, 1881, to June 30, 1881 (Solicitor Treasury's office).		1 00
		Washington Gas-Light Company:		
		Gas consumed from May 1, 1881, to June 1, 1881, 9,100 feet, at $2.25 per 1,000 feet	20 48	
		Discount, 25 cents per 1,000 feet.	2 28	
				18 20
		James W. Conner:		
		Hauling one load of books to the city post-office		1 00
		The Herdic Phaeton Company:		
June	11.	125 street-car fare tickets, at 4 cents.		5 00
		Western Union Telegraph Company:		
		Telegraphing for office of Attorney-General for May, 1881		52 90
		Adams Express Company:		
		Freight charges for transportation of government property for May, 1881		2 65
		American Union Telegraph Company:		
		Telegraphing for office of Attorney-General for May, 1881		3 79
		Charles H. Lee:		
		Salary as driver of department carriage, &c., for June, 1881		69 20
		Washington Gas-Light Company:		
		Gas consumed from June 1, 1881, to July 1, 1881, 7,300 feet, at $2.25 per 1,000 feet	16 43	
		Discount, 25 cents per 1,000 feet	1 83	
				14 60
		Adams Express Company:		
		Freight charges for transportation of government property		2 20
		Great Falls Ice Company:		
April	30.	2,800 pounds ice, 22 cents	6 16	
May	31.	2,900 pounds ice, 22 cents	6 38	
June	30.	2,850 pounds ice, 22 cents.	6 27	
				18 81
		George C. Maynard:		
May	21.	Repairing electric bells		1 50
		Washington City post-office:		
		Box-rent, postage on letters, &c., from April 1 to June 30, 1881		1 53
		Western Union Telegraph Company:		
		Telegraphing for office of Attorney-General for June, 1881		37 85

		Western Union Telegraph Company:		
		Telegraphing for office Solicitor of Treasury for May, 1881.....		$12 90
		Western Union Telegraph Company:		
		Telegraphing for office Solicitor of Treasury for June, 1881.....		17 80
		American Union Telegraph Company:		
		Telegraphing for office Solicitor of Treasury for June, 1881.....		5 04
1880.		Leadingham & Co.:		
Aug.	2.	2 horses to board 1 month		50 00
		Murray & Barker:		
July	4.	2 removes, 50 cents; (11) 2 removes, 50 cents	$1 00	
	17.	1 remove, 25; (24) 4 shoes, $2.....	2 25	
				3 25
		John McDermott & Bro.:		
	15.	Repairing door and hinges.....	2 75	
		Altering pole and iron lugs and bolts.....	4 50	
		Repairing leather on 2 shafts.....	2 00	
		Repairing spring curtain barrel.....	1 50	
		Axle-washers and tightening-up gearing.....	3 75	
		Painting, gearing, and tucking up with the body and varnishing	25 00	
				39 50
		Leadingham & Co.:		
Sept.	1.	2 horses to keep 1 month, at $25		50 00
		Murray & Barker:		
Aug.	31.	2 removes and 4 shoes		2 50
		Murray & Barker:		
Sept.	7.	4 shoes, $2; (11) 1 remove and leather, 35 cents.....		2 35
		Leadingham & Co.:		
		2 horses to board for September, at $25.....		50 00
		Murray & Barker:		
Oct.	9.	2 shoes; (13) 2 shoes.....	1 00	
		2 removes.....	1 50	
				2 50
		Leadingham & Co.:		
Nov.	1.	2 horses to board from October 1 to October 31, 1880		50 00
		John McDermott & Bros.:		
Oct.	15.	2 new gums in shaft heads.....	75	
		2 bolts in heads, 50 cents; 2 safety straps, $1	1 50	
		2 new leather curtains lined with cloth, straps, &c.....	8 00	
		Repairing inside linings and curtains	2 00	
		Axle washers, and repairing gearing.....	6 25	
				18 50
		Conrad Becker:		
July	1.	Bottle hoof ointment	1 25	
Sept.	6.	Repairing breeching and belly-bands	1 50	
		Repairing traces, 40 cents; repairing hame-tugs and new clips, 75 cents.....	1 15	
		Repairing reins and bridle.....	25	
		New cap and repairing collar-pad (October 15).....	25	
		Repairing collar	1 50	
		Repairing lining, $1.25, and binding large buffalo robe, $8.75	10 00	
		Repairing lining, $1; binding small buffalo robe, $7.75..	8 75	
				24 65
		Leadingham & Co.:		
Dec.	1.	2 horses to board from November 1, 1880		50 00
		Murray & Barker:		
Nov.	3.	1 remove	25	
	7.	1 remove, 50 cents; (19) 4 shoes, $2.....	2 50	
	30.	4 shoes	2 00	
				4 75
		John McDermott & Bros.:		
	10.	Repairing iron and covering hood	6 00	
		Taking out summer linings and tacking up	1 50	
		Repairing glass frame covers and shaft ends	3 50	
				11 00
		Murray & Barker:		
Dec.	20.	4 shoes, $2; (21) 4 shoes, $2.....		4 00

		Leadingham & Co.:		
		2 horses to board 1 month from December 1, 1880		$50 00
		Arthur Nattans:		
	1.	Gargling oil for stable		1 00
		Conrad Becker:		
	2.	Repairing harness, $5.50; repairing breeching, 25 cents.	$5 75	
	6.	Repairing set of harness	2 80	
	6.	1 ring-bit, $1.50; 1 front, 75 cents; 1 pair rosettes, $1	3 25	
		Washing, oiling, and blacking harness	2 50	
	13.	Repairing harness	2 50	
				16 80
1881.		Murray & Barker:		
Jan.	1.	4 removes, sharp, $1.25; (7) 1 remove, 25 cents; (8) 4 shoes, $2	3 50	
	14.	4 shoes, $2; (27) 4 removes, sharp, $1.25	3 25	
				6 75
		Leadingham & Co.:		
Feb.	1.	2 horses to board 1 month from January 1, 1881		50 00
		John McDermott & Bros.:		
Jan.	1.	Repairing curtains and straps	1 50	
		New swingle-tree, new felloe, and spring-plate	2 00	
		New bolts, axle-washers, and repairing gearing	5 75	
	18.	4 bolts, $1; (22) axle-washers and new bolts, $2.50	3 50	
	26.	New glass and repairing cover	2 00	
				14 75
		Murray & Barker:		
Feb.	1.	4 shoes, $2; (15) 4 shoes, $2		4 00
		Arthur Nattans:		
	6.	1 bottle gargling oil (for stable)		1 00
		Leadingham & Co.:		
		2 horses to board for month of February, 1881		50 00
		Conrad Becker:		
Jan.	8.	1 steel snaffle-bit	2 50	
	26.	2 new tugs and repairing breeching	2 60	
	27.	2 bottles hoof-ointment	2 00	
	26.	Repairing halter	50	
				7 60
		Murray & Barker:		
Mar.	7.	4 shoes		2 00
		Leadingham & Co.:		
		2 horses to board 1 month from March 1, 1881		50 00
		Arthur Nattans:		
	12.	Dalley's salve, 50 cents; horse medicine, $1	1 50	
	13.	Horse powder, 25 cents; (18) horse drench, $1	1 25	
				2 75
		John McDermott & Bros.:		
Feb.	17.	Repairing spring-curtain barrels	75	
		Repairing doors and locks	2 00	
	23.	Repairing doors and hinges	1 75	
Mar.	23.	New cloth on division front	2 50	
		New glass, $1; repairing lining, $1.50	2 50	
Apr.	11.	New glass and repairing frames	1 50	
		Door check	50	
		Axle-washers, and repairing gearings	2 50	
	14.	Repairing wheels and putting on tires and new bolts, $9; repairing spring, $2.50	11 50	
		Repairing gearing and axle-washers	5 75	
		2 new step-caps	6 50	
		Covering two glass frames with cloth; repairing dash	4 75	
		Repairing spring-curtain barrels and shaft-leathers	2 00	
		Painting office carriage and inside linings repaired	32 00	
				76 50
		Conrad Becker:		
Mar.	9.	1 gilt front on bridle	1 75	
		New lining in two terrets	1 50	
	17.	Repairing set single harness	3 75	
		Washing, oiling, and blacking	2 50	
		Lining and stuffing saddle	1 25	

	31.	Repairing collar	$0 75	
April	5.	1 English top on whip	1 00	
	19.	Covering 4 hames with patent leather	2 00	
		2 new heavy silver terrets in saddle	3 25	
		2 new heavy hame-straps	50	
		2 new heavy spread-straps	50	
		1 pair rosettes, 75; repairing set double harness, $3.87	4 62	
		Washing, oiling, and blacking double harness	3 00	
	20.	1 pair fronts	1 50	
	27.	1 tongue bit	2 50	
				$30 37
		Murray & Barker:		
	9.	4 shoes, $2; (12) 4 shoes, $2	4 00	
	18.	4 shoes	2 00	
				6 00
		Leadingham & Co.:		
May	1.	Keeping 2 horses 1 month, at $25	50 00	
		Keeping 1 horse 20 days, from April 10, 1881	16 66	
				66 66
		Leadingham & Co.:		
June	1.	2 horses to board from May 1st	50 00	
		1 horse to board, 11 days, at 83⅓ cents	9 16	
				59 16
		Murray & Barker:		
May	1.	2 removes, 50 cents; (2) 2 shoes, $1; (6) 2 shoes, $1	2 50	
	12.	2 shoes, $1; (21) 8 removes, $4	5 00	
				7 50
		Leadingham & Co.:		
		Board of 2 horses during June		50 00
		Arthur Nattans:		
	16.	Horse salve		50
1881.		Murray & Barker:		
June	1.	2 removes	50	
	2.	2 shoes	1 00	
	12.	2 removes	50	
	14.	2 shoes	1 00	
	18.	2 shoes	1 00	
	21.	4 shoes and 1 remove	2 25	
				6 25
		Andrew J. Joyce:		
June	6.	To repairs on department carriage:		
		2 new shafts and new shaft-bar	6 50	
		16 new spokes	6 40	
		1 new hub	2 50	
		Wedging spokes in 2 wheels	1 00	
		Repair door-pillar, bradding-up body, &c	1 75	
		Repair roof on carriage	1 00	
		Setting shaft irons	75	
		3 new tires, bolts, and nuts	10 50	
		4 new axle arms and boxes, and wedging boxes in wheels	16 00	
		Setting 1 tire and 4 fire-bolts	1 25	
		Piecing king-bolt	50	
		Closing up shaft lugs	50	
		2 new axle clips, 1 coupling, and 9 c.-bolts and nuts	2 50	
		New trimming carriage throughout with brown cloth, new holder-tassels, carpet rugs, carpet on rockers, trimming shifting front inside, trimming shafts, cover glass frames, silk sun-curtains, cover dash, gum apron, canvas top	165 00	
		Skin down, paint, stripe, and varnish	60 00	
				276 15
1880.		H. O. Towles:		
July	7.	Leather revolving chair		15 00
		J. G. Weaver:		
Sept.	18.	Repairing and upholstering 2 chairs, at $1.25	2 50	
		Repairing and upholstering 1 chair, at 75	75	
		Repairing and upholstering and castors 2 chairs, at $1.25	2 50	
		Repairing 1 sofa, $2; repairing 1 chair, and caned, $1.75	3 75	
		Repairing 2 chairs, and varnished same, at $1.00	2 00	

		Upholstered and repaired 2 chairs, at $6.50	$13 00	
		Making 100 file boxes, at 60c	60 00	
		(Solicitor Treasury's Office.)		$84 50
		J. G. Weaver:		
Sept.	3.	Repairing 1 chair, 50; covering desk-slope, $1.50	2 00	
		1 foot stool, $2.50; (14) fixing book-case, 75	3 25	
		Covering desk-slope, $1.50	1 50	
				6 75
		J. G. Weaver:		
		Mending one desk, $2.50	2 50	
		Bottom 3 chairs, at $1.10, $3.30; covering 1 foot stool, $1	4 30	
		Repairing 1 book case, 50; mending chair, 50	1 00	
				7 80
		J. G. Weaver:		
Nov.	6.	Covered and varnished 1 desk, $8	8 00	
		Repaired 1 hat-rack, $1.50	1 50	
		Covered foot stool, $1; repaired case, 50	1 50	
				11 00
		John Wishaw:		
	9.	Furnishing 4 pigeon-hole cases for room No. 8		20 00
1880.		M. W. Beveridge:		
		1 wood basket		4 50
		J. G. Weaver:		
Nov.	27.	Upholstering 3 chairs in leather		5 25
		J. G. Weaver:		
Dec.	11.	Making ink-holder, 75 cents; 2 cases shelving, $40	40 75	
		1 case of shelving, $15; shelving in closet, $1.50	16 50	
		6 pigeon holes, $12; fixing 10 locks and fitting key, $5	17 00	
		Making 3 glass ventilators, $11.25; making wood box, $5.50	16 75	
				91 00
		Farrel & Co.:		
Dec.		Safe, as per contract		450 00
		J. G. Weaver:		
Dec.	24.	1 triple screen		15 00
		James Talty:		
Dec.	2.	1 heavy fancy double bracket	3 25	
		1 Argand chimney, 10 cents; 1 Argand burner, $1	1 10	
		1 best porcelain shade, 75 cents; 1 extension holder, 60 cents	1 35	
				5 70
		E. F. Simpson:		
		1 S. S. Franklin, $30; 2 joints and damper, $1.50	31 50	
		1 zinc board, $3; 1 piece zinc, $1.25	4 25	
		Put down zinc, 50 cents; move and black stove and put up with 1½ joints, 2 elbows and flange, $3.25	3 75	
		1 shovel, 25 cents; 1 zinc board, $1.50	1 75	
		Move and black large stove and put up with 4 joints and elbow up flue, repair and fasten fire-board	5 50	
		1 zinc board, $1.75; black and clean stove and 1 mica, $1.50; 1 C. T. fire-board, $3	6 25	
		1 zinc board, $2; 1 spark guard, $5	7 00	
				60 00
		James Taggart:		
		1 black walnut writing-desk		50 00
		H. O. Towles:		
Aug.	12.	1 office-table		9 00
1881.		J. G. Weaver:		
Jan.	11.	Putting in Yale lock, $4.50	4 50	
Feb.	10.	Divisions to drawers, $2.50	2 50	
	10.	Repairing chairs, $4.25; repairing drawers, 50 cents	4 75	
				11 75
		James Talty:		
		Taking out old lining of refrigerator, putting in new lining to same, including solder, &c		7 50

		J. G. Weaver:		
Mar.	16.	Repaired, covered, and varnished 1 desk	$6 00	
		Repaired, covered, and varnished 1 table	4 25	
		Repaired, covered, and varnished 1 table	5 50	
		Repaired 1 chair, 50 cents; repaired 1 book-rest, 75 cents.	1 25	
		Repaired 1 desk, 50 cents	50	
		Making case for library	27 50	
				$45 00
		M. W. Beveridge:		
		½ doz. cuspadores		4 00
		M. W. Beveridge:		
		1 lava cuspadore		45
		M. W, Beveridge:		
		1 lava cuspadore		45
		J. G. Weaver:		
Apr.	9.	Covering and varnishing 1 table	8 50	
		Making envelope case	7 50	
		Mending and seating 1 chair	1 50	
				17 50
		J. G. Weaver:		
Apr.	9.	Making 2 paper trays, $2.50	5 00	
		Seating chair, $1; (23) repairing chair, $1	2 00	
May	7.	Upholstering 1 chair in leather, $3.50	3 50	
	28.	Putting on 2 sets of castors on desk	1 75	
June	7.	Repairing chair, 50 cents; making 1 walnut shelf, $1	1 50	
	21.	Repairing sofa and 2 chairs, $2	2 00	
	21.	Repair stand	1 00	
	25.	Making walnut book stand, $7.50	7 50	
				24 25
		W. B. Moses & Son:		
June	29.	Two office chairs		16 00
		W. B. Moses & Son:		
June	29.	One leather lounge		32 00
1880.		John N. Hoffman:		
		1 copy of Lippincott's Gazetteer of the World		10 00
		G. N. Rider:		
July	28.	7 parts Earth and its Inhabitants, at 50 cents, 17 to 23, inclusive		3 50
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	19.	1 Alabama Report, vol. 11	30 00	
		1 Chaney's Michigan Digest	6 00	
		1 Plaisted's Maine Digest	10 00	
				46 00
		Robert Beall:		
Aug.	13.	Vol. 13 Charles Sumner's Works		3 00
		Little, Brown & Co.:		
	12.	1 Dawes' Abridgment, 8 vols		15 00
		J. J. Chapman:		
	14.	Life of Garfield	2 25	
	20.	1 McPherson Hand-Book	2 00	
				4 25
		Little, Brown & Co:		
Nov.	23.	1 Dakota Reports, vol. 1, $6; 1 Longues' Louisiana Digest, $15	21 00	
		1 Kentucky Injunctions, $5; 1 Morse on Banking, $5	10 00	
		1 Story's Equity Pleadings, $5; 1 Bishop Contracts $3.50.	8 50	
		1 Thompson Carriers	5 50	
		1 Langdell Summary of Equity Pleadings	2 00	
				47 50
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	1 dozen large reversible holders	6 00	
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	1 ream paper	4 50	
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			462 40

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	2 inkstands, 50c.; 1 great gross rubber bands, $2.50	3 00	
	2 great gross rubber bands, ¼-in	3 00	
	1 dozen hexagon pencils, 75c.; 1 box pyramid pins, $1.50	2 25	
	½ ream envelope paper	4 00	
	1 ream 14 lb. legal cap, $6; 2 spools red tape, $1	7 00	
	1 bottle gumoline, 25c.; 2 boxes steel pens, $2.50	2 75	
	One penknife	3 50	
	1 ream letter paper, $4.50; 1 qt. Freeman's crystal ink, 75c.; 1 box steel pens, $1	6 25	
	1 package note paper	2 00	
	1 quart mucilage, $1; 500 letter envelopes, $2	3 00	
	5 spools red tape, $1.50; ½ ream envelope paper, $3.50	5 00	
	1 ream French note paper	4 00	
	2 dozen hexagon pencils, No. 2, 75c	1 50	
	2 glass inkstands, $3.50; 1 qt. M. & N. ink, 50c	4 00	
	½ ream legal cap, $2.50; 1 qt. French copying ink, $1	3 50	
	1 ream P. & P. 6 lb. note	3 50	
	1 ream do. 12 lb. Cong. letter, $4.50; 1 bottle carmine ink, 50c	5 00	
	1 do. foolscap, $4; 2 bottles ink, $1	5 00	
	1 mucilage stand, $2; 1 box note paper, $2	4 00	
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		———	133 15
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21.	3 Russell's binders for newspapers	9 00	
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		———	61 30
	Robert Beall:		
9.	3 letter-press books, $2.50	7 50	
10.	3 dozen lead pencils, at 75c	2 25	
	1 great gross rubber bands	3 00	
	1 great gross rubber bands	1 50	
	3 bottles M. & N. ink	1 50	
	5 spools red tape	3 00	
	2 boxes engrossing pens	2 50	
	2 quarts best mucilage	2 00	
	6 cut-glass inkstands	5 00	
	2 balls twine	1 50	
	2 dozen sheets blotting board	2 00	

		1 dozen best blue pencils	$1 50	
		6 bottles carmine ink	2 50	
		1,500 letter envelopes	6 00	
		500 official envelopes, No. 10	3 50	
		1 ream letter paper	4 50	
		½ ream English cream note	3 00	
		½ ream foolscap	2 50	
	14.	1,000 official envelopes	6 00	
	17.	6 packages waste-paper, at 30 cents	1 80	
		1 ream note-paper	3 50	
	20.	2 boxes pens	2 50	
	23.	1 inkstand	1 50	
		½ ream legal cap	2 50	
		1 box falcon pens	75	
		(For office of Solicitor of Treasury.)	———	$73 80
		M. E. Boardman:		
Aug.	16.	1 blank book, $1.50; 1 pocket-book, $3.50	5 00	
		1 dozen No. 2 Faber's pencil, hexagon	75	
		24 quarts Shepard & Allens' ink	24 00	
		1 notary's Bible (for use of department)	1 50	
			———	31 25
		Robert Beall:		
Aug.	10.	2 boxes white envelopes	2 00	
	11.	2 spools red tape	1 00	
	12.	1 ream legal cap	5 00	
	14.	½ ream English note paper	2 50	
		10 packages English envelopes	2 50	
		2 boxes Spencerian pens	2 50	
		1 dozen lead pencils	75	
	16.	1 ream 7-pound note paper	3 00	
	18.	1 box falcon pens	75	
		2 bottles French ink	2 00	
	19.	500 No. 6 letter envelopes	2 00	
	21.	1 box bank pens	1 00	
	30.	1 box pyramid pins	1 25	
		(For office of Solicitor of Treasury.)	———	26 25
		J. C. Blair:		
		200 A tablets, express prepaid		15 50
		M. E. Boardman:		
Sept.	7.	6 mammoth rubbers	1 50	
		1 dozen blue pencils	1 25	
	8.	1 dozen each red and green pencils, at $1.25	2 50	
		1 dozen blue pencils	1 50	
	9.	1 ream Treasury blotting paper	27 50	
	14.	1,000 mixed envelopes	10 00	
			———	44 25
		J. J. Chapman:		
Aug.	9.	6 inkstands, 75 cents each	4 50	
Sept.	14.	3 paper binders, $3	9 00	
	25.	1,000 manila envelopes	2 50	
	29.	5 reams English paper, $4.50	22 50	
		2,500 English envelopes	22 50	
		6 dozen pieces fine sponge, $1.25 each	7 50	
			———	68 50
		Robert Beall:		
Sept.	1.	1 box pyramid pins	1 25	
		½ pint violet ink	25	
		1 dozen Faber's pencils, No. 2	50	
		2 packages note envelopes	30	
		2 dozen sheets blotting-board	2 00	
	2.	2,000 official envelopes	18 00	
		1 dozen Faber's pencils	50	
	4.	1 box pens	1 25	
	8.	2 reams 12-pound letter paper, $4.50	9 00	
		½ ream envelope paper	3 50	
	10.	10 reams manila waste-paper	3 00	
		1 ream P. & P. 8-pound note	3 00	
	11½.	ream manila wrapping-paper	5 00	

11.	1 memorandum book		$0 50	
13.	1,000 note envelopes		3 00	
18.	1 box Gillott's pens No. 303		1 25	
	1 bottle writing fluid		75	
	1 box rubber bands		1 50	
20.	1 bottle mucilage		1 00	
22.	1 box falcon pens		75	
23.	2 dozen hexagon pencils, 75 cents		1 50	
24.	½ ream Congress letter		2 25	
	1 box No. 6 white envelopes		1 00	
	1 pint black ink		40	
25.	1 box Gillott's pens		1 00	
	2 rubber pen-holders		75	
	(For Office of Solicitor of Treasury.)		———	$63 20
	H. Jacobs:			
	3 gross aluminum pens at 2.50 gross			7 50
Oct. 1.	Robert Beall:			
	¼ ream note paper		75	
	1 bottle ink		25	
	2 cut-glass inkstands		85	
4.	1 box envelopes		1 00	
	1 box Falcon pens		75	
	2 rubber pen-holders		50	
	1 pencil, 10 cents, 1 piece rubber eraser, 10 cents		20	
	1 sheet blotting-board		10	
6.	½ ream legal cap		2 50	
	2 gross rubber bands		3 00	
	2 boxes envelopes		4 00	
	1 bundle waste paper		3 50	
	½ ream note paper		2 00	
	10 quires English note		3 50	
	2 dozen pen-holders		85	
	24 pieces sponge		2 50	
7.	1 box white envelopes		1 00	
9.	½ dozen steel erasers (cocoa handles)		2 00	
	1 box leads for automatic pencils		30	
	1 ivory pencil		50	
11.	10 packages envelopes		1 50	
13.	2 spools red tape		1 00	
	1 bottle French copying ink		1 00	
16.	1 ream Congress cap		5 00	
19.	10 quires English note paper		2 50	
	10 packages English note envelopes		2 50	
	1 ream P. and P. note		3 00	
	1 box Gillott's No. 303 pens		1 25	
	1 box Gillott's No. 404 pens		75	
	4 quarts M. and N. ink		2 00	
	2 quarts Arnold's ink		1 00	
	2 quarts copying ink		2 00	
	1 box round head paper fasteners		3 50	
	3 dozen Faber's round pencils		1 50	
22.	Buck-handle pen-knife		3 50	
23.	½ ream letter-paper		2 25	
	(For Office of Solicitor of Treasury.)		———	64 03
	M. E. Boardman:			
	2 dozen mixed rubber pen-holders, $4.80		9 60	
	3 reams heavy foolscap, $6.50		19 50	
	1 dozen quarts Carter's mucilage		12 00	
	500 superfine cards, 40 cents		2 00	
			———	43 10
Nov. —.	M. E. Boardman:			
	60 reams manila paper, 35 cents		21 00	
	1 dozen tablets		2 40	
15.	1 blotting-pad		1 50	
	1 pair shears		1 00	
20.	6 gross Lyons & Patterson pens, $2 each		12 00	
27.	1 waste-basket, $1; 1 call-bell, $2.50		3 50	
	2 dozen pyramid pins, $3; 2 gross flourishing pens, $3		6 00	
			———	47 40

		James J. Chapman:		
Oct.	15.	1 ream paper cut to size	$3 00	
	20.	1 desk pad	1 25	
Nov.	4.	500 cards printing, $6.25; 1 blank book, $2.25	8 50	
	11.	1 ivory folder	1 25	
	12.	1 blank book, indexed through	2 00	
		1 box thumb tacks	60	
	13.	1 double inkstand and tray to order	4 50	
	13.	6 solid memos., 25, $1.50; 12 solid memos. large, 50, $6.00	7 50	
	24.	1 dozen copy books, 500 pages	18 00	
	29.	framing picture	1 50	
			———	$48 10
		Robert Beall:		
Nov.	2.	2 bottles of ink	1 00	
	11.	½ ream letter paper	2 25	
	20.	1 pair shears, $1.00: penknife, $2.00	3 00	
Dec.	7.	1 great gross rubber bands, No. 11	3 00	
	7.	2 quarts Carter's mucilage	2 00	
		1 quart M. and N. ink	50	
		1 dozen Faber's hexagon pencils	75	
		1 dozen Faber's round pencils	50	
		¼ ream manila wrapping	2 00	
		2 dozen sheets blotting board	2 00	
		1 box Gillott's pens, 404	75	
Dec.	14.	1 box of pens	1 25	
		1 box Spencerian pens	1 25	
	15.	1 Waste basket	1 00	
		1 ream letter paper	4 50	
		1 ream note paper	3 50	
		500 note envelopes	2 00	
		500 letter envelopes	2 50	
	16.	250 envelopes, No. 6	1 00	
		¼ ream heavy cream note	1 50	
		10 packages heavy cream envelopes	2 50	
		½ ream pen note, $1.50; 3 steel erasers, $1.20	2 70	
		1 dozen Faber's round pencils	50	
	18.	1 gross Dreka's engrossing pens	1 00	
	23.	1 bottle violet ink	35	
	24.	1 penknife	3 00	
		(Solicitor's Treasury's office.)	— ——	46 30
		M. E. Boardman:		
Dec.	4.	1 office basket	1 00	
	20.	50 cloth-lined envelopes, 5 cents	2 50	
	33.	½ ream post-office paper	3 75	
			———	7 25
1881.		M. E. Boardman:		
Jan.	6.	10 packs blank cards	2 00	
	17.	½ ream 200-pounds manila paper	11 25	
		1 Mark Twain scrap book	1 75	
		½ M open-end manila envelopes	5 00	
	20.	1 ream heavy legal cap	6 00	
	21.	3 gross rubber bands	2 25	
		2 gross rubber bands, $2; 2 gross, $2	4 00	
		1 gross, $1.25; 1 gross, $1.25; 1 gross, $2	4 50	
			———	36 75
1880.		James J. Chapman:		
Dec.	8.	2 reams English note	10 00	
		1,000 envelopes, $7.50; 1 knife, $2.50	10 00	
	16.	500 cards and printing, $1.25	6 25	
			———	26 25
1881.		James J. Chapman:		
Jan.	6.	1 calendar, $4: (11) 500 cards and stamping, $8	12 00	
	11.	500 envelopes	3 75	
	18.	2 rubber rulers	1 00	
Feb.	18.	½ ream envelope paper	3 00	
			———	19 75

		M. E. Boardman:		
	9.	1 record book	$2 75	
		Lettering and indexing	1 25	
	14.	1 record book	2 75	
		Lettering and indexing same	1 25	
				$8 00
		W. H. & O. H. Morrison:		
		1 diary, $1; 1 do., $.75; 1 do., $1	2 75	
		1 ink extractor	25	
				3 00
		M. E. Boardman:		
Mar.	9.	250 visiting cards	1 25	
	15.	1 doz. Faber's pencils	1 00	
	16.	1 box card envelopes	2 00	
	26.	500 visiting cards	2 00	
		500 visiting cards	2 50	
		1 knife eraser	1 00	
		1 Faber's mammoth eraser	25	
				10 00
		M. E. Boardman:		
Apr.	12.	1 dozen David's carmine ink	4 20	
		1 waste basket	1 00	
				5 20
1880.		Robert Beall:		
July	1.	Schlegel's Philosophy of Life	1 40	
		Statesman's Year Book for 1880	3 00	
		Encyclopedia Britannica, vol. 11	10 00	
		(Solicitor of the Treasury's office.)		
				14 40
		M. E. Mann:		
		Annual Cyclopædia, 1879, Vol. 4 (Solicitor of the Treasury's office).		7 00
		W. H. & O. H. Morrison:		
Jan.	5.	1 each Wait's Actions and Defenses, vols. 2, 3, 4, 5, at $6.	24 00	
		1 Maryland Reports, vol. 48	5 00	
		1 Law Review No. 1, 50 cents; No. 2, 50 cents	1 00	
		1 New York Reports, vol. 75	1 50	
		1 Grattan's Reports, vol. 30	6 00	
		1 each Law Review, Nos. 3, 4, and 5	1 50	
		1 Repelyer's Federal Digest	8 00	
		1 Bowle's Financial History of United States	2 50	
		1 Jones' R. R. Securities	6 00	
		1 Grattan's Virginia Reports, vol. 31	6 00	
		1 Wharton's State Trials	6 00	
		1 High on Receivers	6 50	
		1 Law Review, No. 6	50	
		1 California Reports, vol. 53	3 75	
		1 each New York Reports, vols. 18 and 19 (Hun.)	5 50	
		1 Oregon Reports, vol. 7	5 50	
		1 Iowa Reports, vol. 48	4 75	
		1 each Pennsylvania Reports, vols. 84, 85, 86, 87, and 88, at $4.50	22 50	
		1 each New York Reports, vols. 21, 22, 23, and 24, at $2.75.	11 00	
		1 each Georgia Reports, vols. 59, 60, and 61, at $6	18 00	
		1 Massachusetts Reports, vol. 126	3 50	
		1 Abbott's National Digest, vol. 8	6 00	
July	5.	1 each Ohio Reports, vols. 32, 33, and 34, at $3	9 00	
		1 each Michigan Reports, vols. 38, 40, and 41, at $3.50	10 50	
		1 each Illinois Reports, 82 to 91, inclusive, at $2.75	27 50	
		1 each Maryland Reports, 49 and 50, at $5	10 00	
		1 each Hun. New York Reports, vol. 27	2 75	
		1 New Jersey Law, Vroom, vol. 12	4 00	
		1 Wisconsin, vol. 48	3 00	
		1 each New York Reports, vol. 76 and 77, at $1.50	3 00	
		1 Wisconsin, vol. 46	2 75	
		1 each Iowa Reports, vols. 49, 50, and 51, at $5	15 00	
		1 Wyoming Reports, vol. 1	5 00	
		1 each Alabama, vols. 51 and 61, at $5.75	11 50	
		1 Louisiana Annual, vol. 31	8 00	
		1 Texas, vol. 50	6 50	
		1 Connecticut Reports, vol. 42	5 25	

	1 Mississippi Reports, vol. 54			$5 50
	1 Law Review, No. 7			50
	1 Illinois Reports, vol. 92			1 75
	1 each Maine Reports, vols. 65, 66, 67, 68, and 69, at $4.50			22 50
	1 New Jersey Equity Reports, 4 Stewart			4 50
	1 New Jersey Law Reports, Vroom, vol. 11			4 50
	1 each New Hampshire Reports, vols. 56, 57, at $4.50			9 00
	1 each Alabama Reports, vols. 45, 46, 47, 48, 49, 50, and 52, at $6			42 00
	1 each Vermont Reports, vol. 48, 49, 50, and 51, at $4.75			19 00
	1 each North Carolina Reports, vols. 81, 82, at $4.75			9 50
	1 each Kansas Reports, vols. 18, 19, 20, 21, 22, and 23, at $3.50			21 00
	1 Law Review, No. 8			50
	1 Grattan Reports, 32			6 00
	1 Florida Reports, vol. 13			7 00
	1 each Rhode Island, vols. 10, 11, 12, at $5.75			17 25
	(Solicitor of the Treasury's office.)			
				$449 25
	American News Company:			
	Parts 19 and 20, Round the World with Grant			1 00
	(Solicitor of the Treasury's office.)			
	Robert Beall:			
	1 Official Railroad Guide			50
	(Solicitor of the Treasury's office.)			
	Internal Revenue Record:			
	1½ years subscription, January 1, 1880, to June 30, 1881			6 00
	(Solicitor of the Treasury's office.)			
	Robert Beall:			
Aug. 18.	Riddle's Life of Garfield			1 75
	(Solicitor of the Treasury's office.)			
	James Anglim & Co.:			
	1 set Chambers' English Literature, 4 vols		4 00	
	1 set Plutarch's Lives, 3 vols		2 25	
	(Solicitor of the Treasury's office.)			
				6 25
1881.	John L. Ginck & Co.:			
Jan. 1.	Washington Law Report, subscription from January 1, 1881, to December 31, 1881			3 00
	(Solicitor of the Treasury's office.)			
1880.	Robert Beall:			
Dec. 15.	1 Student's Hume		1 75	
	1 History of our own Times, 2 vols		2 50	
1881.				
Jan. 10.	1 Stories from Virgil		2 00	
				6 25
	Total amount actually expended			11,678 07
	Balance of appropriation not expended			21 93
	Total amount of appropriation			11,700 00

EXHIBIT H.—*Report of the Librarian of the Department of Justice.*

DEPARTMENT OF JUSTICE,
November 4, 1881.

SIR: I have the honor herewith to submit my annual report of books and pamphlets received by this department for distribution since November 12, 1880.

November, 1880.—Received from the Public Printer 999 copies of the 15th volume of the Opinions of the Attorney-General; distributed, 439 copies; remaining, 560 copies.

January 20, 1881.—Received from the Public Printer 850 copies of the Reports of the Department; distributed, 525 copies; remaining, 325 copies.

January 20, 1881.—Received from the Court of Claims 14 copies of the 15th volume of the Reports of the Court of Claims for the use of this department.

February, 1881.—Received from the Public Printer 1,000 copies of the 16th volume of the Opinions of the Attorney-General; distributed, 420 copies; remaining, 580 copies.

May 27, 1881.—Received from the Department of the Interior 150 copies of the 12th volume of Otto's Supreme Court Reports; distributed, 125 copies; remaining, 25 copies.

June 23, 1881.—Received from the Public Printer 48 copies of volume 1, series 1, War of the Rebellion; distributed, 3 copies; remaining, 45 copies.

August, 1881.—Received from the Public Printer 425 copies of Pamphlet Laws Forty-sixth Congress, third session; distributed, 28 copies; remaining, 397 copies.

August, 1881.—Received from the Public Printer 49 copies of volume 2, series 1, of the War of the Rebellion; distributed, 0 copies; remaining, 49 copies.

October 11, 1881.—Received from the Public Printer 450 copies of the Supplement to the Revised Statutes of the United States, volume 1; distributed, 410 copies; remaining, 40 copies.

October, 1881.—Received from the Department of the Interior 150 copies of the 13th volume of Otto's Supreme Court Reports; distributed, 123 copies; remaining, 27 copies.

This department also distributed the following-named books since my last report:

Opinions, vol. 13, 33 copies; vol. 14, 18 copies; Statutes, vol. 18, 1 copy; vol. 19, 3 copies; vol. 20, 4 copies; Revised Statutes United States, 2d edition, 1878, 3 copies.

Wallace Supreme Court Reports, vol. 14, 1 copy; vol. 16, 2 copies; vol. 17, 1 copy; vol. 19, 3 copies; vol. 20, 2 copies; vol. 22, 2 copies; vol. 23, 2 copies.

Otto's Supreme Court Reports, vol. 3, 2 copies; vol. 4, 2 copies; vol. 5, 2 copies; vol. 6, 1 copy; vol. 7, 1 copy; vol. 8, 2 copies; vol. 9, 1 copy; vol. 10, 1 copy; vol. 11, 1 copy.

Very respectfully,

H. A. KLOPFER,
Librarian.

EXHIBIT J.—*Report of the Architect of the Capitol.*

ARCHITECT'S OFFICE, UNITED STATES CAPITOL,
Washington, D. C., October 18, 1881.

SIR: I have the honor to report that during the fiscal year ending June 30, 1881, there have been various improvements and repairs made to the court-house in this city, such as painting court and other rooms, repairs to roof and ceilings, and keeping in repair the various heating furnaces; the amount expended for these being $1,000.

During the storm on the night of June 27, 1881, the entire northern portion of the roof of this building was blown off, and much damage done to the eastern portion of the roof. One chimney was torn down, and the stone cappings of several others were torn off by the timbers of the roof. Several houses in the neighborhood were also somewhat injured by the timbers and tin covering, which were blown from this building with great violence.

To prevent any interruption to the courts, and preserve the public records, steps were at once taken to put a new roof on the northern and to repair the other portions of the roof which were damaged. The ceilings in the court rooms were also repaired, and the building was put in such a condition as to be suitable for use.

The expense incurred in making these necessary repairs is $1,830.76; for which sum Congress should be asked to provide as a deficiency at the next session.

Very respectfully,

EDWARD CLARK,
Architect United States Capitol.

Hon. WAYNE MACVEAGH,
Attorney-General.

EXHIBIT K.—*Statement of expenditures made by the Department of Justice out of the appropriation to defray the expenses of the courts of the United States for* 1878 *and prior years, paid out during the fiscal year ending June* 30, 1881.

Districts.	Marshals.	Attorneys.	Clerks.	Commissioners.	Rents.	Miscellaneous.	Total.
Alabama, northern district							
Alabama, middle district				$35 90			$35 90
Alabama, southern district							
Arizona						$133 00	133 00
Arkansas, eastern district	$679 48	$600 00				793 72	2,073 20
Arkansas, western district				48 30		84 00	132 30
California							
Colorado							
Connecticut	33 04						33 04
Dakota							
Delaware							
District of Columbia							
Florida, northern district							
Florida, southern district							
Georgia, northern district							
Georgia, southern district							
Idaho							
Illinois, northern district						67 50	67 50
Illinois, southern district							
Indiana				62 05		30 00	92 05
Iowa							
Kansas				427 85			427 85
Kentucky						25 50	25 50
Louisiana				770 00			770 00
Maine							
Maryland				6 90			6 90
Massachusetts			$121 39				121 39
Michigan, eastern district							
Michigan, western district							
Minnesota							
Mississippi, northern district							
Mississippi, southern district				127 75			127 75
Missouri, eastern district	25 30						25 30
Missouri, western district							
Montana		100 00					100 00
Nebraska							
Nevada							
New Hampshire				167 90			167 90
New Jersey							
New Mexico	667 60					14 00	681 60
New York, northern district							
New York, southern district							
New York, eastern district							
North Carolina, eastern district							
North Carolina, western district							
Ohio, northern district						31 95	31 95
Ohio, southern district				20 15			20 15
Oregon				26 00			26 00
Pennsylvania, eastern district							
Pennsylvania, western district							
Rhode Island							
South Carolina							
Tennessee, eastern district	277 81						277 81
Texas, eastern district						8 50	8 50
Texas, northern district							
Texas, western district	230 70		9 25				239 95
Utah	2,455 59					642 50	3,098 09
Vermont				18 10			18 10
Virginia, eastern district				44 65			44 65
Virginia, western district					$800 00		800 00
Washington							
West Virginia				239 05			239 05
Wisconsin, eastern district				1,479 85			1,479 85
Wisconsin, western district							
Wyoming							
Total	4,369 52	700 00	130 64	3,474 45	800 00	1,830 67	11,305 28

EXHIBIT L.—*Statement of expenditures made by the Department of Justice out of the appropriations to defray the expenses of the courts of the United States for* 1878, *paid out during the fiscal year ending June* 30, 1881.

Districts.	Marshals.	Attorneys.	Clerks.	Commissioners.	Rents.	Miscellaneous.	Total.
Alabama, northern district	$8,828 19	$300 00	.....	$343 59	.....	.....	$9,471 78
Alabama, middle and southern district	.....	.....	.....	2 55	.....	.....	2 55
Arizona	227 66	.....	.....	.....	.....	$33 00	260 66
Arkansas, eastern district	.....	.....	.....	.....	.....	.....	.....
Arkansas, western district	.....	.....	.....	.....	.....	.....	.....
California	.....	.....	.....	.....	.....	560 00	560 00
Colorado	.....	.....	.....	.....	.....	.....	.....
Connecticut	122 08	.....	.....	.....	.....	.....	122 08
Dakota	.....	.....	.....	.....	.....	.....	.....
Delaware	.....	.....	.....	.....	.....	.....	.....
District of Columbia	.....	.....	.....	.....	.....	.....	.....
Florida, northern district	.....	850 00	.....	.....	.....	.....	850 00
Florida, southern district	.....	.....	.....	.....	.....	.....	.....
Georgia, northern district	.....	.....	.....	.....	.....	33 25	33 25
Georgia, southern district	.....	.....	.....	.....	.....	.....	.....
Idaho	.....	.....	.....	.....	.....	.....	.....
Illinois, northern district	.....	.....	.....	.....	.....	.....	.....
Illinois, southern district	.....	.....	.....	.....	.....	.....	.....
Indiana	2,217 29	20 00	.....	.....	.....	165 00	2,402 29
Iowa	.....	.....	.....	.....	.....	.....	.....
Kansas	.....	.....	.....	1 90	.....	.....	1 90
Kentucky	3,235 78	.....	.....	.....	.....	.....	3,235 78
Louisiana	2,877 18	6 00	.....	.....	.....	.....	2,883 18
Maine	1,071 38	.....	.....	.....	.....	.....	1,071 38
Maryland	.....	.....	.....	.....	.....	.....	.....
Massachusetts	.....	.....	.....	.....	.....	.....	.....
Michigan, eastern district	.....	.....	.....	8 00	.....	.....	8 00
Michigan, western district	.....	.....	.....	.....	.....	.....	.....
Minnesota	.....	.....	.....	.....	.....	.....	.....
Mississippi, northern district	.....	.....	.....	.....	.....	.....	.....
Mississippi, southern district	.....	.....	.....	.....	.....	.....	.....
Missouri, eastern district	.....	.....	.....	4 00	.....	.....	4 00
Missouri, western district	.....	.....	.....	.....	.....	.....	.....
Montana	.....	.....	.....	55 65	.....	.....	55 65
Nebraska	.....	.....	.....	.....	.....	.....	.....
Nevada	.....	.....	.....	.....	.....	457 00	457 00
New Hampshire	.....	.....	.....	15 80	.....	.....	15 80
New Jersey	574 17	.....	.....	.....	.....	.....	574 17
New Mexico	4,000 00	.....	.....	.....	.....	.....	4,000 00
New York, northern district	156 41	.....	.....	.....	.....	47 75	204 16
New York, southern district	.....	.....	.....	.....	.....	.....	.....
New York, eastern district	.....	.....	.....	.....	.....	.....	.....
North Carolina, eastern district	455 50	66 00	.....	.....	.....	.....	521 50
North Carolina, western district	.....	.....	.....	8 95	.....	.....	8 95
Ohio, northern district	.....	.....	.....	.....	.....	.....	.....
Ohio, southern district	.....	.....	.....	22 00	.....	.....	22 00
Oregon	.....	.....	.....	.....	.....	.....	.....
Pennsylvania, eastern district	.....	.....	.....	25 00	.....	.....	25 00
Pennsylvania, western district	.....	.....	.....	.....	$150 00	.....	150 00
Rhode Island	.....	.....	.....	.....	.....	.....	.....
South Carolina	1,667 86	.....	.....	.....	.....	.....	1,667 86
Tennessee, eastern district	.....	.....	.....	.....	.....	.....	.....
Tennessee, middle district	.....	.....	.....	75 25	.....	.....	75 25
Tennessee, western district	.....	.....	.....	.....	.....	.....	.....
Texas, eastern district	.....	.....	$4 58	.....	.....	178 00	182 58
Texas, middle district	.....	.....	.....	.....	.....	.....	.....
Texas, western district	.....	.....	.....	.....	.....	.....	.....
Utah	.....	.....	.....	.....	.....	.....	.....
Vermont	.....	.....	10 15	.....	.....	.....	10 15
Virginia, eastern district	.....	.....	.....	.....	.....	33 75	33 75
Virginia, western district	.....	.....	.....	10 40	400 00	.....	410 40
Washington	.....	.....	.....	.....	.....	20 35	20 35
West Virginia	.....	.....	.....	18 70	.....	.....	18 70
Wisconsin, eastern district	.....	.....	.....	.....	.....	.....	.....
Wisconsin, western district	.....	.....	.....	.....	.....	.....	.....
Wyoming	69 37	.....	.....	.....	.....	.....	69 37
Total	25,502 87	1,242 00	14 73	591 79	550 00	1,528 10	29,429 49

EXHIBIT M.—*Statement of expenditures made by the Department of Justice out of the appropriation to defray the expenses of the courts of the United States during the fiscal year ending June* 30, 1879, *paid out during the fiscal year ending June* 30, 1881.

Districts.	Marshals.	Attorneys.	Clerks.	Commissioners.	Rents.	Miscellaneous.	Total.
Alabama, northern district	$25,525 74	.....	.....	$4,080 98	$250 00	.....	$29,856 72
Alabama, middle district	4,974 62	$15 00	$1,370 05	1,693 85	375 00	$383 50	8,812 02
Alabama, southern district	.....	.....	.....	.....	.....	.....	.....
Arizona	.....	350 00	436 65	45 25	213 00	1,444 87	2,489 77
Arkansas, eastern district	1,193 02	.....	435 37	575 80	300 00	1,015 00	3,519 19
Arkansas, western district	14,453 29	.....	999 90	1,287 60	2,550 00	4 90	19,295 69
California	.....	750 00	1,927 38	698 80	.....	1,462 25	4,838 43
Colorado	.....	186 27	203 68	.....	450 00	117 33	957 28
Connecticut	1,127 01	744 20	835 20	146 55	560 00	.....	3,412 96
Dakota	6,194 82	410 00	206 70	433 55	450 00	.....	7,695 07
Delaware	97 13	230 00	472 20	22 70	.....	.....	822 03
District of Columbia	.....	.....	.....	11 70	.....	381 75	393 45
Florida, northern district	530 36	614 16	634 65	460 90	275 00	.....	2,515 07
Florida, southern district	183 48	.....	343 66	156 55	250 00	.....	933 69
Georgia, northern district	1,045 59	15 00	627 50	668 90	400 00	185 80	2,942 79
Georgia, southern district	.....	.....	603 70	146 25	.....	.....	749 95
Idaho	188 52	40 00	.....	11 30	250 00	76 50	566 32
Illinois, northern district	.....	875 00	.....	.....	500 00	2,345 75	3,720 75
Illinois, southern district	581 95	221 50	745 00	102 50	.....	.....	1,650 95
Indiana	2,298 77	866 60	.....	14 85	.....	1,295 75	4,475 97
Iowa	4,848 04	1,955 00	675 95	927 20	325 00	1,112 12	9,843 31
Kansas	1,586 04	168 00	846 67	545 80	150 00	298 00	3,594 51
Kentucky	3,852 99	375 00	2,599 66	1,586 65	150 00	45 00	8,609 30
Louisiana	2,654 21	2,295 00	1,908 85	326 65	.....	72 00	7,256 71
Maine	3,873 47	629 16	316 55	330 95	.....	263 25	5,413 38
Maryland	3,134 87	390 00	235 50	534 45	.....	2,113 34	6,408 16
Massachusetts	1,455 04	1,377 70	2,051 17	923 94	.....	76 00	5,883 85
Michigan, eastern district	1,685 45	952 20	1,954 20	204 15	.....	2,448 51	7,244 51
Michigan, western district	863 18	875 60	1,715 00	198 25	275 00	.....	3,927 03
Minnesota	1,585 21	657 60	1,253 92	538 90	.....	189 75	4,225 38
Mississippi, northern district	3,476 94	1,619 10	962 70	21 50	700 00	.....	6,780 24
Mississippi, southern district	.....	10 00	546 67	.....	.....	20 00	576 67
Missouri, eastern district	32 00	.....	476 70	395 50	.....	855 80	1,760 00
Missouri, western district	586 84	.....	720 83	226 20	643 77	1,449 25	3,626 89
Montana	.....	.....	447 20	133 90	135 00	.....	716 10
Nebraska	1,515 97	273 48	503 15	185 75	.....	193 50	2,671 85
Nevada	.....	.....	.....	.....	.....	292 33	292 33
New Hampshire	159 18	15 00	298 89	36 10	250 00	135 73	894 90
New Jersey	2,493 60	.....	580 00	1,440 60	.....	338 75	4,852 95
New Mexico	.....	170 00	121 90	31 53	.....	.....	323 43
New York, northern district	.....	732 20	1,077 48	2,482 50	387 50	3,259 55	7,939 23
New York, southern district	2,733 23	44 45	.....	740 25	.....	118 76	3,636 69
New York, eastern district	.....	3,390 00	1,063 30	2,159 15	583 33	651 28	7,847 06
North Carolina, eastern dist	4,460 20	300 00	541 45	821 05	387 50	.....	6,510 20
North Carolina, western dist	.....	.....	4,844 09	8,120 25	.....	1,180 88	14,145 22
Ohio, northern district	176 05	1,228 40	1,564 11	275 65	300 00	1 58	3,545 79
Ohio, southern district	.....	985 00	.....	461 75	.....	1,694 17	3,140 92
Oregon	1,283 56	1,480 60	944 90	402 70	.....	609 61	4,721 37
Pennsylvania, eastern dist	2,047 64	2,415 00	.....	642 70	.....	2,937 38	8,042 72
Pennsylvania, western dist	2,853 36	.....	640 00	22 00	300 00	2,232 00	6,047 36
Rhode Island	.....	.....	240 45	.....	.....	364 47	604 92
South Carolina	1,365 04	625 00	623 80	2,831 35	.....	13 90	5,459 09
Tennessee, eastern district	1,852 28	10 00	.....	2,747 08	.....	.....	4,609 36
Tennessee, middle district	1,976 22	1,513 75	3,675 71	352 80	425 00	647 75	8,591 23
Tennessee, western district	.....	.....	2,428 35	24 05	543 77	.....	2,996 17
Texas, eastern district	1,198 41	.....	1,303 36	405 65	.....	500 57	3,407 99
Texas, northern district	3,056 46	157 70	95 50	1,455 90	.....	.....	4,765 56
Texas, western district	.....	1,645 00	2,755 85	.....	825 00	781 25	6,007 10
Utah	.....	.....	.....	.....	2,406 66	240 00	2,646 66
Vermont	.....	.....	298 90	.....	.....	.....	298 90
Virginia, eastern district	.....	.....	.....	115 25	.....	.....	115 25
Virginia, western district	.....	.....	1,646 05	1,925 20	1,425 00	.....	4,996 25
Washington	.....	60 00	225 00	1 40	.....	.....	286 40
West Virginia	400 00	2,485 45	1,456 40	192 50	.....	822 25	5,356 60
Wisconsin, eastern district	600 68	442 50	191 35	771 55	.....	299 00	2,305 08
Wisconsin, western district	.....	.....	623 75	23 25	.....	.....	647 00
Wyoming	287 71	.....	515 93	47 30	500 00	13 33	1,364 27
Total	116,488 17	34,595 62	54,812 88	46,167 33	17,535 53	34,984 46	304,583 99

EXHIBIT N.—*Statement of the expenditures made by the Department of Justice out of the appropriations to defray the expenses of the courts of the United States during the fiscal year* 1880, *paid out during the fiscal year ending June* 30, 1881.

Districts.	Marshals.	Attorneys.	Clerks.	Jurors.	Witnesses.	Prisoners.	Commissioners.	Rents.	Miscellaneous.	Total.
Alabama, northern district	$4,119 35	$250 00	$1,752 60		$2,529 30	$1,000 00	$377 90	$250 00	$682 00	$10,961 15
Alabama, middle district	23,471 34		973 35	$78 50	292 30	1,942 54	706 95	375 00	159 50	27,999 48
Alabama, southern district		517 40	652 89				951 70			2,121 99
Arizona		320 00	362 35			2,720 24		252 00		3,654 59
Arkansas, eastern district	4,058 32	610 00	1,100 90	19 00		3,022 56	430 15	300 00	19 05	9,559 98
Arkansas, western district	22,238 94	300 00	1,218 60		2,000 00	4,750 00	2,351 90		929 00	33,788 44
California	2,000 00	2,305 00	1,505 70	1,566 70		6,687 00	874 75	1,700 00	752 00	17,391 15
Colorado	1,841 90	212 25	966 68				167 28	637 50	324 00	4,149 61
Connecticut	1,000 00	715 20	472 28		338 10	644 59	414 20	200 00	82 26	3,866 63
Dakota	2,198 67	169 00	120 80		20 00	3,600 00	404 95	1,157 34	5,638 80	13,309 56
Delaware	818 95	225 00					65 75			1,109 70
District of Columbia	5,123 10	1,973 31		8,578 00	15,000 00		126 70		668 00	31,469 11
Florida, northern district	3,500 00	904 90	889 85				426 18	275 00	1,193 19	7,189 12
Florida, southern district	156 28	15 00	228 04					268 00		667 32
Georgia, northern district	14,121 80	745 80	717 35		305 10	4,611 63	3,325 40	600 00	1,677 53	26,104 61
Georgia, southern district							199 75			199 75
Idaho	1,401 87	235 00	234 85			809 39	32 70	1,001 80	928 10	4,643 71
Illinois, northern district	560 05	1,100 00				2,224 30	144 70		4 00	4,033 05
Illinois, southern district	5,763 88	1,058 40	1,375 15	940 00		1,000 00	570 50		912 00	11,619 93
Indiana	4,528 54	1,773 60		14 60	895 55	3,394 70	551 40		532 96	11,691 35
Iowa		685 00	2,269 90			1,817 71	1,071 30	475 00		6,318 91
Kansas	5,488 04	330 00	1,358 66		172 50	885 60	632 45	150 00		9,017 25
Kentucky	2,500 00	2,499 00	1,813 70			4,173 95	1,344 35	150 00	271 87	12,752 87
Louisiana		875 00	961 10	1,900 00			516 10			4,252 20
Maine	1,820 28	320 60	303 25	13 30		623 89	143 40		280 50	3,505 22
Maryland	2,000 00	1,215 00	522 60			1,875 95	443 25		91 15	6,147 95
Massachusetts	2,000 00	2,752 75				3,748 67	719 00			9,220 42
Michigan, eastern district	2,500 00	500 00	1,249 20		250 00	1,963 95	674 60		600 00	7,737 75
Michigan, western district	1,744 57		1,467 76			764 24	231 25	125 00	870 50	5,203 32
Minnesota	7,850 05	1,054 60	1,100 00			255 50	489 95	50 00	130 80	10,930 90
Mississippi, northern district		669 10	543 09			50 00	87 05	563 00		1,912 24
Mississippi, southern district		715 00					46 00			761 00
Missouri, eastern district	10,180 44	776 40				166 06	264 25		754 40	12,141 55
Missouri, western district	3,000 00	281 40	1,281 04	20 65		2,657 00	478 04	925 00		8,643 13
Montana	4,000 00	240 00	405 39			1,458 00	81 35	310 00	1,405 60	7,900 34
Nebraska	1,707 16	169 00	247 19			2,019 60	135 05		30 30	4,308 30
Nevada		237 20				580 33		600 00		1,417 53
New Hampshire	848 19	127 20	328 63			136 00	89 80	250 00		1,779 82
New Jersey			1,491 50			1,987 37	1,109 10		78 00	4,665 97
New Mexico		300 00	251 25				10 00			561 25
New York, northern district	4,000 00	1,446 80		5 00		3,700 50	2,501 80	387 50	920 00	12,961 60
New York, southern district	4,486 85	7,275 45	1,122 90	512 11	875 50	2,676 00	1,290 72		4,007 36	22,246 89

New York, eastern district	1,519 83	1,260 00	914 75			420 96	999 00	583 33		5,697 87
North Carolina, eastern district	2,600 00	145 00	224 61				684 85	412 50		4,066 96
North Carolina, western district	20,000 00	300 00	1,696 74	326 15	1,500 00	5,690 48	7,687 45	60 00	250 00	37,510 82
Ohio, northern district	3,498 00	1,280 60	1,118 77			1,422 35	246 20	300 00	78 30	9,944 22
Ohio, southern district	8,500 00	1,201 70	1,607 29			1,795 20	597 35		1,040 00	14,741 54
Oregon	8,900 00	1,150 00	1,203 17			2,660 13	196 05		35 00	14,144 35
Pennsylvania, eastern district	1,776 35	2,300 00	285 00	36 70		4,680 25	759 90		249 57	10,087 77
Pennsylvania, western district	612 73	1,689 00	1,118 15			2,557 07	189 20	250 00	184 10	6,600 25
Rhode Island	483 30		361 25			652 77	10 55		545 00	2,052 87
South Carolina	10,368 86	530 00	392 95	1,187 50		1,250 00	1,374 95		48 00	15,152 26
Tennessee, eastern district	5,000 00	300 00	77 37		3,305 54	2,057 11	3,549 99		347 00	14,637 01
Tennessee, middle district	886 00	250 00		5 00		1,821 30	306 45	425 00	239 30	3,933 05
Tennessee, western district	2,145 35	748 00	1,155 40			24 50	224 60	581 25	736 22	5,615 32
Texas, eastern district		1,152 60	11 00			854 95	152 90	500 00	505 77	3,177 22
Texas, northern district	6,387 71	530 50	1,079 80			105 50	963 95	1,535 03		10,602 49
Texas, western district	20,015 61	465 00	290 00	3,350 00		1,058 25	839 90	1,450 00	680 38	28,149 14
Utah	2,779 10	632 80	55 20			70 00	120 60	2,250 30		5,908 00
Vermont	505 01		230 00				158 45		499 47	1,392 93
Virginia, eastern district	1,000 00	718 60	1,672 00				221 05		270 00	3,881 65
Virginia, western district	18,000 00	1,633 00	2,896 70		6,700 00	2,837 85	4,406 65	1,100 00	10 00	37,584 20
Washington	1,095 24	10 00	392 45	84 20	83 65	2,026 97	51 80		628 35	4,372 66
West Virginia	1,000 00	3,421 10	1,905 96		989 70	3,341 25	249 40		849 50	11,756 91
Wisconsin, eastern district	2,021 74	455 00	371 35			161 00	747 50		126 00	3,882 59
Wisconsin, western district	328 20	740 00	715 33			13 00	137 70		429 86	2,364 09
Wyoming	1,005 50	246 00	231 65			500 00	101 35	1,200 00	263 79	3,548 29
Total	273,457 10	57,058 26	49,295 44	18,637 41	35,257 24	103,948 16	49,459 46	21,649 55	31,958 48	640,721 10

EXHIBIT O.—*Statement of expenses of United States courts made during and for the fiscal year ending June* 30, 1881.

Districts.	Marshals.	Jurors.	Witnesses.	Prisoners.	Attorneys.	Clerks.	Commissioners.	Rents.	Miscellaneous.	Total.
Alabama, northern district	$9,150 00	$4,000 00	$13,600 00	$1,600 00	$2,363 60	$1,521 05	$3,130 55	$750 00	$1,377 50	$37,492 70
Alabama, middle district	24,098 80	12,050 00	34,000 00	4,000 00	5,930 30	1,588 00	5,310 60	1,125 00	4,175 00	92,277 70
Alabama, southern district					1,654 80	985 75	175 80			2,816 35
Arizona	11,250 00	2,500 00	1,500 00	4,585 75	480 00	498 70		115 00	865 00	21,794 45
Arkansas, eastern district	10,600 00	4,186 00	5,400 00	3,225 50	1,802 00	2,489 23	331 55	900 00	3,040 00	31,974 28
Arkansas, western district	38,733 42	14,900 00	64,197 00	16,566 50	6,674 00	3,691 21	5,471 50		10,647 00	160,880 63
California	11,700 00	9,902 00	9,950 00	9,296 25	7,260 00	7,509 96	2,637 65	425 00	6,482 00	65,162 86
Colorado	10,575 00	8,880 00	11,086 00	2,288 00	1,740 02	653 91	777 08	1,862 50	4,111 15	41,973 66
Connecticut	2,000 00	1,993 00	1,590 00	1,002 28	1,453 60	595 33	269 90	656 00	487 00	10,047 11
Dakota	21,000 00	12,145 00	19,340 00	8,900 00	3,565 50	2,192 88	755 30	2,100 00	5,362 15	75,360 83
Delaware	1,770 00	2,116 00	2,650 00	580 00	1,095 00	1,159 00	96 55		2,091 00	11,587 55
District of Columbia	4,027 30	28,752 00	4,476 93	64,000 00	12,894 04	4,875 45	97 40	150 00	26,684 00	145,957 12
Supreme Court									25,000 00	25,000 00
Florida, northern district	10,810 00	5,430 00	13,600 00	1,500 00	4,570 60	1,179 55	920 15	825 00	2,795 00	41,630 30
Florida, southern district	1,622 00	3,076 00	800 00	338 00	465 60	595 31	10 00	785 00	1,345 00	9,036 91
Georgia, northern district						8,336 67	5,841 35			87,783 51
Georgia, southern district	25,908 84	8,146 65	34,650 00	4,900 00	8,703 20	1,326 98	259 15		3,010 00	13,299 33
Idaho	6,000 00	7,500 00	2,200 00	5,087 00	1,398 00	652 25	44 20	750 00	1,236 35	24,767 80
Illinois, northern district	6,900 00	9,800 00	9,450 00	4,241 80	3,500 00		960 35		5,395 00	40,247 15
Illinois, southern district	14,000 00	9,800 00	13,300 00	3,600 00	4,141 80	1,961 85	626 00		5,974 35	53,404 00
Indiana	7,000 00	5,820 00	9,120 00	4,593 25	2,360 00	968 35	879 15		2,459 30	33,200 05
Iowa	21,000 00	12,079 65	18,578 35	2,740 44	9,315 50	3,146 77	2,276 55	900 00	7,010 00	77,047 26
Kansas	9,200 00	6,327 00	10,410 00	3,177 50	5,655 44	1,877 54	1,669 90	150 00	1,375 00	39,842 38
Kentucky	33,061 00	6,845 00	20,700 00	9,890 00	3,767 01	1,992 45	3,092 70	400 00	3,244 00	82,992 16
Louisiana	10,000 00	8,920 00	3,350 00	1,000 00	5,620 00	238 15	3,971 10		4,050 00	37,149 25
Maine	4,000 00	2,824 00	2,987 00	1,621 31	1,331 15	286 30	968 90		2,250 00	16,268 66
Maryland	6,250 00	4,630 00	3,800 00	2,299 66	2,880 00	1,809 55	1,992 40		3,495 00	27,156 61
Massachusetts	4,000 00	11,000 00	6,000 00	4,262 57	7,045 00	2,978 10	2,927 45		6,808 00	45,021 12
Michigan, eastern district	5,460 00	7,058 00	2,918 00	6,375 82	2,416 20	989 20	511 80		3,090 00	28,819 02
Michigan, western district	3,600 00	5,560 00	1,600 00	639 00	3,226 50	1,233 50	254 95	375 00	2,930 00	19,418 95
Minnesota	8,300 00	4,588 00	5,100 00	1,629 00	4,023 70	885 10	1,916 40		1,866 00	28,308 20
Mississippi, northern district	4,281 00	6,242 00	6,299 00	500 00	2,284 10	1,607 44	188 65	610 33	1,630 00	23,642 52
Mississippi, southern district	4,700 00	5,000 00	3,200 00	300 00	3,144 89	947 55	25 65		1,175 00	18,493 09
Missouri, eastern district	15,200 00	7,900 00	11,600 00	1,272 15	8,886 56		1,196 75		3,552 75	49,608 21
Missouri, western district	15,100 00	10,265 00	9,100 00	4,566 25	3,371 40	1,389 85	1,673 99	2,775 00	3,324 00	51,565 49
Montana	4,865 00	3,550 00	3,550 00	7,450 00	2,047 40	1,008 05	30 85	630 00	3,465 00	26,596 30
Nebraska	8,945 13	8,880 00	7,600 00	2,498 80	1,711 20	1,957 85	712 55		2,201 00	34,506 53
Nevada			253 00	1,286 00	1,100 80				1,667 00	4,306 80
New Hampshire	1,300 00	1,600 00	800 00	381 00	297 20	452 90	56 05	150 00	1,010 00	6,047 15
New Jersey	5,940 00	4,556 00	3,259 00	2,976 75	2,140 00	927 94	4,138 45		3,968 79	27,906 93
New Mexico	3,700 00	10,720 00	4,010 00	2,200 00	1,724 60	1,287 20			2,006 00	25,647 80
New York, northern district	23,900 00	3,350 00	36,600 00	5,167 42	8,415 20	2,304 25	12,698 37	343 75	2,811 00	95,589 99
New York, southern district	7,000 00	9,300 00	5,000 00	6,215 52	20,452 49	591 63	7,845 59		19,813 30	76,218 53
New York, eastern district	4,433 00	1,330 00	1,000 00	1,013 44	4,515 00	1,965 24	2,184 95	6,416 63	5,655 00	28,513 26

NorthCarolina, eastern district.	4,435 00	3,440 00	5,990 00	400 00	3,694 66	1,959 56	1,470 20	1,187 50	1,115 00	23,691 52
NorthCarolina, western district.	18,000 00	4,300 00	15,000 00	4,136 36	6,098 60	3,733 48	1,290 03	130 00	2,273 00	54,961 47
Ohio, northern district	5,625 00	8,280 00	4,350 00	1,436 76	3,087 40	2,465 88	586 65	900 00	3,834 00	30,565 69
Ohio, southern district	10,000 00	8,340 00	7,400 00	2,836 40	5,555 10	3,454 86	2,459 85		5,700 00	45,746 21
Oregon	16,500 00	5,650 00	4,258 00	2,996 45	4,002 65	4,270 46	982 80		4,879 00	43,539 36
Pennsylvania, eastern district	6,997 72	9,452 00	4,205 50	6,282 15	4,760 00	260 00	4,511 45		4,625 00	41,093 82
Pennsylvania, western district	4,000 00	19,645 80	6,073 80	4,131 75	4,278 94	2,215 55	157 95	50 00	3,149 12	43,702 91
Rhode Island	1,300 00	1,320 00	550 00	893 03	758 00	354 35	145 60		1,730 00	7,050 98
South Carolina	13,000 00	7,986 00	21,000 00	2,650 00	11,492 96	4,077 70	6,272 10	125 00	4,510 00	71,113 76
Tennessee, eastern district	6,500 00	2,600 00	10,000 00	3,000 00	4,933 13	3,053 94	2,237 40		496 00	32,820 47
Tennessee, middle district	8,000 00	2,900 00	7,760 00	4,407 75	6,364 20	4,084 54	3,622 80	1,275 00	2,042 68	40,456 97
Tennessee, western district	6,094 00	3,236 00	2,463 00	1,185 00	2,212 80	1,634 60	276 70	1,743 75	4,198 00	23,043 85
Texas, eastern district	12,200 00	4,615 00	9,140 00	1,924 25	3,643 40	4,348 46	331 20	1,200 00	3,963 60	41,365 91
Texas, northern district	8,000 00	10,580 00	5,500 00	2,349 95	2,512 50	2,790 67	1,298 55	1,800 00	3,050 00	37,881 67
Texas, western district	22,655 00	6,978 00	12,826 00	2,880 25	2,458 00	4,676 44	2,828 36	2,250 00	2,820 00	60,372 05
Utah	2,575 00	9,200 00	1,900 00		2,415 60	906 65	105 05	1,950 00	1,495 00	20,547 30
Vermont	1,372 00	1,582 00	940 00	700 00	601 80	224 15			1,201 68	6,621 63
Virginia, eastern district	2,800 00	6,558 00	3,177 00	853 00	2,902 00	4,048 70	299 05		5,403 00	26,040 75
Virginia, western district	15,150 00	6,039 00	17,434 00	1,500 00	3,738 20	4,510 30	2,686 70	650 00	1,572 00	53,280 20
Washington	3,538 00	3,992 00	1,895 00	6,285 00	2,075 00	1,549 98	165 56		1,901 00	21,401 54
West Virginia	8,243 00	10,560 00	10,950 00	4,533 00	3,184 20	2,047 62	998 40		2,497 00	43,013 22
Wisconsin, eastern district	4,500 00	5,057 00	1,964 00	620 55	2,244 00	947 20	676 70		2,066 00	18,075 45
Wisconsin, western district	4,400 00	5,087 00	4,522 00	764 29	1,351 45	724 90	160 90		2,087 00	19,097 54
Wyoming	3,466 00	1,148 00	2,826 00	4,600 00	1,081 80	932 60	78 40	1,100 00	1,108 50	16,341 30
Total	610,731 21	442,097 10	580,748 58	271,132 90	262,769 79	131,930 58	112,570 63	37,555 46	268,650 22	2,718,186 47

EXHIBIT P.—*Statement showing the number of assistants to the United States attorneys, their employment and compensation, from December* 1, 1880, *to December* 1, 1881.

Districts.	Regular assistants.	Compensation.	Remarks.
Alabama, northern district.	L. W. Day	$1,000 per annum	
Arkansas, western district.	George A. Grace	$1,200 per annum	
California	A. P. Van Duzer	$2,750 per annum	
Do	W. E. Lovett	$1,250 per annum	To July 1, 1881.
		$1,500 per annum	After July 1, 1881.
Colorado	Charles H. Toll	$500 per annum	Resigned March 7, 1881.
Georgia, southern district	S. A. Darnell	$1,500 per annum	To January 1, 1881.
		$1,800 per annum	After January 1, 1881.
Illinois, northern district	J. St. Clair Boal	$2,200 per annum	
Do	J. A. Baldwin	$1,000 per annum	To August 1, 1881.
		$1,500 per annum	After August 1, 1881.
Illinois, southern district	E. T. Roe	$1,000 per annum	To August 1, 1881.
		$1,500 per annum	After August 1, 1881.
Indiana	L. H. Richardson	do	To July 1, 1881.
Do	C. H. McCarrer	do	After July 1, 1881.
Iowa	W. T. Rankin	$800 per annum	
Do	J. M. Ballou	$900 per annum	
Kansas	T. J. Humes	$1,500 per annum	To June 1, 1881.
Do	C. B. Smith	$1,000 per annum	After July 1, 1881.
Kentucky	W. A. Bullitt	do	
Louisiana	J. W. Gurley	$2,500 per annum	
Maryland	A. M. Rogers	$1,200 per annum	
Massachusetts	P. Cummings	$1,000 per annum	
Do	George P. Sanger, jr.	$1,500 per annum	
Do	E. W. Burdett	do	To January 1, 1881.
Do	Henry Howland	do	After January 1, 1881.
Michigan, eastern district	J. W. Finney	$2,000 per annum	
Michigan, western district	R. M. Montgomery	Fees	
Do	W. D. Fuller	do	
Minnesota	C. M. Green	Fees from district attorney's office.	
Mississippi, southern district.	H. R. Ware	$1,000 per annum	
Missouri, eastern district	C. G. B. Drummond	$2,000 per annum	
Do	Elenious Smith	$1,000 per annum	
Missouri, western district	M. J. Leaming	do	
New Jersey	George M. Keasbey	$800 per annum	
New York, northern district	J. C. Green	$2,000 per annum	To August 1, 1881.
		$2,500 per annum	After August 1, 1881.
Do	W. V. S. Woodward	$1,700 per annum	To August 1, 1881.
		$2,000 per annum	After August 1, 1881.
New York, southern district	A. B. Herrick	$3,000 per annum	To April 1, 1881.
		$3,500 per annum	To July 1, 1881.
		$4,000 per annum	After July 1, 1881.
Do	W. P. Fiero	$3,000 per annum	To April 1, 1881.
		$3,500 per annum	To July 1, 1881.
		$4,000 per annum	After July 1, 1881.
Do	S. B. Clarke	$2,000 per annum	To July 1, 1881.
		$4,000 per annum	After July 1, 1881.
Do	F. H. Platt	$2,000 per annum	To April 1, 1881.
Do	S. Tenney	$1,500 per annum	
Do	E. B. Hill	do	To July 1, 1881.
		$1,750 per annum	After July 1, 1881.
Do	J. P. Clarke	$1,500 per annum	Do.
Do	C. P. James	$4,000 per annum	Do.
Do	G. E. P. Howard	$1,700 per annum	Do.
Do	H. R. Wilson	$1,500 per annum	Do.
Do	W. C. Wallace	do	Do.
Do	J. G. Agar	do	Do.
Do	A. B. Conkling	do	Do.
New York, eastern district	F. W. Angel	$2,500 per annum	Do.
North Carolina, eastern district.	Willis Bagley	$1,000 per annum	
North Carolina, western district.	W. S. Ball	$1,700 per annum	
Ohio, northern district	E. S. Meyer	$1,500 per annum	To January 1, 1881.
		$2,000 per annum	To April 4, 1881.
Do	Francis J. Wing	$1,500 per annum	After July 1, 1881.
Ohio, southern district	Richard Dyer	$2,000 per annum	
Do	D. K. Watson	$1,200 per annum	After July 1, 1881.
Do	Parker Dickson	do	To October 1, 1881; resigned.
Pennsylvania, eastern district.	Hood Gilpin	$1,500 per annum	
Do	H. P. Brown	do	
Pennsylvania, western district.	George C. Wilson	$2,500 per annum	
Do	Samuel Woods	$1,500 per annum	
South Carolina	E. W. M. Mackey	$2,000 per annum	To March 2, 1881.
Do	W. R. Marshall	$100 per annum	Do.
		$1,800 per annum	After March 2, 1881.

EXHIBIT P.—*Statement showing number of assistants to United States attorneys, &c.*—Cont'd.

Districts.	Regular assistants.	Compensation.	Remarks.
Tennessee, eastern district	John P. Smith	$1,200 per annum	
Tennessee, middle district	G. N. Tillman	do	
Tennessee, western district	J. B. Clough	do	
Texas, eastern district	J. R. Burns	$1,500 per annum	
Vermont	J. S. Peck	No salary	
West Virginia	George B. Caldwell	$500 per annum	
Arizona	Murat Masterson	Fees paid by district attorney.	
Do	Hugh Farley	Fees	
Dakota	J. R. Gamble	do	
Idaho	H. M. Bennett	do	Appointed November 23, 1881.
Utah	Z. Snow	$500 per annum	
Do	J. H. Beatty	$2,000 per annum	
Washington	C. H. Harford	Fees	

EXHIBIT P.—*Statement showing number of assistants to United States attorneys, &c.*—Cont'd.

Districts.	Special assistants.	Compensation.	Remarks.
Alabama, southern district	George Turner	$220	Civil cases, circuit court, Mobile.
Arkansas, eastern district	R. R. Gaskill	$30	Case *v.* Deputy Marshal King.
Do	E. W. Kimball	$50	Case *v.* Ned Lawson.
Do	do	$50	Case *v.* J. T. Cox, jr.
Arkansas, western district	George A. Grace	$144	Case *v.* A. Hodges *et als.*
California	A. A. Sargent	Without compensation.	"El Sobrante" case.
Colorado	M. A. McDonald	do	Case *v.* Grand Cañon Coal Company.
Do	W. S. Decker	Undetermined	Do.
Connecticut	C. R. Ingersoll	do	Yale Lock Manufacturing Company cases, &c.
Delaware	A. Higgins	do	Election cases.
District of Columbia	H. H. Wells	$250	Case of J. P. Walker.
Do	do	$100	Do.
Do	W. A. Cook	$750	"Star route" cases.
Do	George Bliss	$2,500 on account	Do.
Do	B. H. Brewster	do	Do.
Do	J. D. Porter	Undetermined	Case *v.* Charles Guiteau.
Do	W. D. Davidge	do	Do.
Do	E. B. Smith	do	Do.
Do	W. A. Cook	do	Case *v.* H. W. Howgate.
Florida, northern district	W. G. M. Davis	$500	Case *v.* H. Jenkins, jr.
Do	A. A. Knight	$1,500	Election cases.
Do	H. Jenkins, jr	$500	Do.
Mississippi, northern district.	H. C. Niles	$600	Do.
Missouri, eastern district	J. Chandler	$1,000	Case *v.* Brittain & Curtis under banking acts.
Do	J. A. Harris		Land fraud cases.
New York, southern district.	Edwards Pierrepont	$2,000 on account	Lewis will case.
Do	George Bliss	$750	Silk fraud cases.
Do	G. E. P. Howard		Suits on forfeited bonds.
Ohio, southern district	H. R. Probasco	$519	Collecting abandoned judgments.
Oregon	B. F. Dowell	$125	Case *v.* W. C. Griswold.
Vermont	C. N. Davenport	$428.20	Bean *v.* Henry.
Do	B. F. Fifield		Do.
Virginia, eastern district	T. S. Atkins	$121	Before grand jury at Alexandria.
Do	B. W. Hoxsey	$165	Before grand jury at Richmond.
Do	do	Undetermined	Suits on forfeited bonds in New York.
Idaho	Alanson Smith	$90	May term third district court.
Do	H. M. Bennett	$300	Do.
Montana	W. T. Saunders	$650	Case *v.* G. W. Fox.
New Mexico	Andrew Sloan	$50	Replevy of government property.

EXHIBIT Q.—*Report of the Solicitor of the Treasury.*

DEPARTMENT OF JUSTICE,
OFFICE OF THE SOLICITOR OF THE TREASURY,
Washington, D. C., November 17, 1881.

SIR: I have the honor to transmit herewith seven tabular statements exhibiting the amount, character and results of the litigation under my direction for the fiscal year ending June 30, 1881, shown by the docket entries of this office.

These tables embrace, respectively—

1. Suits on transcripts of accounts of defaulting public officers, excepting those of the Post-Office Department, adjusted by the accounting officers of the Treasury Department.

2. Post-office suits, embracing those against officers of the Post Office Department, and cases of fines, penalties, and forfeitures for violation of the postal laws.

3. Suits on custom-house bonds.

4. Suits for the recovery of fines, penalties, and forfeitures under the customs-revenue and navigation laws.

5. Suits against collectors of customs and other officers or agents of the government for refund of duties and acts done in the line of their official duty.

6. Suits in which the United States is interested, not embraced in the other classes.

7. A general summary or abstract of all the other tables.

An examination of the tables will show that the whole number of suits commenced within the year was 2,716, of which 72 were of class 1, for the recovery of $488,477.97; 180 were of class 2, for the recovery of $121,720.76; 31 were of class 3, for the recovery of $21,020.81; 201 were of class 4, for the recovery of $235,526.81; 888 were of class 5; 1,344 were of class 6, for the recovery of $500,012.38; making a total sued for, as reported, of $1,366,758.73.

Of the whole number of suits brought, 1,050 were decided in favor of the United States, 7 were adversely decided, 324 were settled and dismissed, in 28 penalties were remitted by the Secretary of the Treasury, leaving 1,307 still pending.

Of those pending at the commencement of the year, 568 were decided for the United States, 91 were decided adversely, 1,283 were settled and dismissed, and in 8 penalties were remitted by the Secretary of the Treasury.

The entire number of suits decided or otherwise disposed of during the year was 3,359; the whole amount for which judgments were obtained, exclusive of decrees *in rem*, was $750,671.83, and the entire amount collected from all sources was $875,564.48.

The number of cases in which offers of compromise were pending and received during the fiscal year ending June 30, 1881, was 190, involving the sum of $2,459,785.97. The number of offers accepted was 72, involving the sum of $615,963.10; amount accepted, $105,058.18. The number of offers rejected was 71, involving the sum of $814,420,48; amount rejected, $70,990.23. The number of offers pending at the close of the year was 47, involving the sum of $1,029,402.39; amount offered in cases pending, $58,011.58.

I desire to bring to your attention a branch of the business of this office involving matters of considerable interest in a pecuniary way to the government, and not before brought in a formal manner to the notice of the head of this department. I refer to lands which from

time to time have been acquired in payment of debt, and are by law under the exclusive charge of the Solicitor of the Treasury.

Section 3470 of the Revised Statutes provides that "at every sale, on execution, at the suit of the United States, of lands or tenements of a debtor, the United States may, by such agent as the Solicitor of the Treasury shall appoint, become the purchaser thereof."

By section 3750 of the same, that officer has charge of all lands and other property which have been or may be set off or conveyed to the United States, and of all trusts created for the use of the same in payment of debts, and of the sale and disposal of such lands, excepting those set off or conveyed in payment of or as security for debts arising under internal revenue laws. The charge of the lands last mentioned devolves by similar law upon the Commissioner of Internal Revenue. By section 3749 of those statutes the Solicitor of the Treasury is authorized, with the approval of the Secretary of the Treasury, to rent for a period not exceeding three years, or to sell at public sale, any unproductive lands or other property of the United States acquired under judicial process or otherwise in the collection of debts, after advertising the time, place, &c., of such sale for three months preceding, in some newspaper published in the vicinity thereof, in such manner and upon such terms as may in his judgment be most advantageous to the public interest. And by the act of June 14, 1878, he is vested with a special authority to lease for a term of years or to sell certain real estate at and near Harper's Ferry in accordance with existing law as to advertising, &c.

Under the operations of these statutes, or of the original acts, lands in all parts of the country have accumulated during fifty years past under the charge of this office. A tabulated statement of the numerous lots and tracts, title to which either absolute or qualified in the United States appears of record, is annexed hereto. These tracts have been acquired for the most part under execution or set-off for the satisfaction of judgments rendered in favor of the United States. In many cases, in order to secure any part of a judgment debt, this office has been obliged to direct the purchase of the lands levied upon and to receive the title of the debtor, or a vesture of his interest in the property, whatever it may be. It so happens that the title or interest thus acquired is often involved in doubt, or that there are defects to be removed, and these practically operate to forbid a sale of the property by the government. In many cases, as the title does not pass immediately to the purchaser because of the different State laws as to the right of the debtor to redeem in a given time, the property continues to remain in the possession of the judgment debtor or in some one claiming title or interest through him. Taxes also in some of the States accrue or have accrued on the lands, and parties continue to hold or claim possession under tax titles, which, in some instances, it may be, have become or are likely to become absolute after a lapse of a few years. Again, there are former judgment liens and incumbrances on some of the tracts of more or less validity. All these circumstances combine to render a general sale of this class of property and even a sale of particular parcels inexpedient. It becomes necessary often to prepare the property for sale to advantage, sometimes by a removal of persons holding possession and in other cases by curing the defects of title. To this end the examination of records and the institution of proper proceedings in court are required, all of which is attended with more or less expense. To a recent period there has been no appropriation by law for the payment of such expenses, not even for the purpose of recording the deeds obtained with the change of owner-

ship, nor any appropriation for the payment of the advertising charges, auction fees, or other attending expenses of sale. Before the passage of the laws guarding the disbursement of appropriations and requiring proceeds of sales, &c., to be covered in the Treasury without abatement, these expenses were provided for out of the purchase money. It is questionable, I think, whether the yearly appropriation of the civil-sundry act for the "custody, care, and protection of lands and other property belonging to the United States" is strictly applicable in all cases. This appropriation is not under the control of or adapted to objects of expenditure in this department, but is made for objects under the control of the Treasury Department. The want of a proper appropriation in the past and the restriction of the law as regards the proceeds have, doubtless, contributed to deter my predecessor from offering for sale much of this property which was substantially free from defects in the title. In consequence there is a great deal of valuable land belonging to the government over which no sufficient care or control has been exercised for years, and the same has become or is likely to become occupied, either without color of title or through tax titles where the same could be acquired. Besides this, the requirement of law that the sale shall be advertised for three months operates to the disadvantage of the government in other ways than as regards the unnecessary expense. It becomes necessary sometimes, in order to sell to the greatest advantage, that the sale take place with reference to particular seasons of the year or to some special opportunity, and in such cases a long period of notice must necessarily overreach the period or opportunity which might be availed of if the time of advertisement was short or discretionary. More recent enactments as to sales of lands under control of the Commissioner of Internal Revenue require but twenty days as the period of advertising in these cases. This is certainly sufficient in these days of speedy communication.

I would therefore respectfully suggest the necessity for legislation, first to provide an appropriation for the purpose of enabling the Solicitor of the Treasury to carry out the provisions of the acts aforesaid and to defray the expenses of the examination of county and other records, of perfecting titles to lands under his charge, and getting the same ready for sale; second, by way of amendment to section 3749 of the Revised Statutes, so as to admit of an advertisement of three weeks in some newspaper published in the vicinity of the property to be sold, and for that or a shorter period in such other newspapers as a proper notice of the sale may seem to him to require.

The following is a draught of a bill to carry these objects into effect.

Respectfully submitted.

K. RAYNER,
Solicitor of the Treasury.

Hon. SAMUEL F. PHILLIPS,
Acting Attorney-General.

AN ACT to enable the Solicitor of the Treasury to carry out the provisions of sections 3749 and 3750 of the Revised Statutes and of the act of June 14, 1878, relating to lands of the United States in his charge, and to amend the same.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the time required in said section 3749 of the Revised Statutes for advertising the time, place, and conditions of sale where lands acquired under judicial process, or otherwise, in the collection of debts are offered for sale by the Solicitor of the Treasury, shall be three weeks in some newspaper published in the vicinity of the property, or for that or a less period in such other newspaper or newspapers beside as may seem to him expedient and in the interest of the United States as regards such sale.

SEC. 2. That the third section of the act of June 14, 1878, entitled "An act authorizing the Solicitor of the Treasury, by and with the consent of the Secretary of War, to cancel certain contracts for the sale of land made at Harper's Ferry in the year 1869 by the United States, to resell the same, and sell or lease all other real estate and riparian rights now owned by the United States at Harper's Ferry, West Virginia," be amended to read as follows: SEC. 3. That the Solicitor of the Treasury is further authorized to make sale, in pursuance of law, of the whole or any part of said property, or, if he deems it expedient and better for the public welfare, lease for any term of years or sell any part of all other real estate and riparian rights now owned by the United States at or near Harper's Ferry, Jefferson County, West Virginia, after advertising the same as provided in the preceding section of this act.

SEC. 3. That the sum of one thousand dollars, to be disbursed under the supervision of the Attorney-General, be appropriated and paid from any moneys in the Treasury not otherwise appropriated, to enable the Solicitor of the Treasury to carry out the provisions of sections 3749 and 3750 of the Revised Statutes and of this act in relation to the sale, care, custody, and protection of lands, the charge of which devolves upon him by the said sections of the Revised Statutes and by the act aforesaid as amended hereby, the sum so appropriated, or so much as may be required, to be used to defray the expense of examining county records, of freeing the property in his charge from defects of title, and kindred expenses, as well as those incident to the preparation of the lands for sale and the sale of the same as authorized by law.

Statement of real property belonging to the United States, or in which it has an interest, acquired in the collection of debts or otherwise, in charge of the Solicitor of the Treasury by law.

ALABAMA.

When acquired.	From whom acquired.	Tracts or lots of land.	Where situated.
Oct. 1, 1877	Thomas C.Clements ..	E. ½ of N. E. ¼ sec. 7, T. 19, R. 9 W.; E. ½, of N. W. ¼, sec. 7, T. 19, R. 9 W.; N. W. ¼ of N. E. ¼, sec. 7, T. 19, R. 9 W., with mill and dwelling-house thereon; S. ½ of S. W. ¼, sec. 25, T. 18, R 10 W.; S. W. ¼ of N. W. ¼, sec. 25, T. 18, R. 10 W.; SE. ¼ of S. E. ¼, sec. 26, T. 18, R. 10 W.; S. E. ¼ of N. E. ¼, sec. 35, T. 18, R. 10 W.; N. W. ¼ of N. W. ¼, sec. 36, T. 18, R. 10 W.	Tuscaloosa County.
Aug. 6, 1878	Joel S. Hawkins.....	S. ½ of N. W. ¼, sec. 5, T. 15, R. 14 W.; N. ½ of S. W. ¼, sec. 5, T. 15, R. 14 W.; N. W. ¼ of N. E. ¼, sec. 7, T. 15, R. 14 W.; E. ½ of S. W. ¼, sec. 7, T. 15, R. 14 W.; W. ½ of S. E. ¼, sec. 7, T. 15, R. 14 W.; N. E. ¼, sec. 18, T. 15, R. 14 W.; N. E. ¼ of N W. ¼, sec. 12, T. 15, R. 15 W.; W. ½ of S. W. ¼, sec. 12, T. 15, R. 15 W.	Lamar County.
Aug. 6, 1878	William Boyd	E. ½ of N. E. ¼, sec. 35, T. 15, R. 16 W.; S. W. ¼ of N. W. ¼, sec. 30, T. 15, R. 16 W.; N. ½ of N. W. ¼, sec. 30, T. 15, R. 16 W.; N. W. ¼ of S. W. ¼, sec. 30, T. 15, R. 16 W.	Do.
July 2, 1877	Wm. M. Scarborough.	N. E. ¼ of N. E. ¼, sec. 24, T. 21, R. 8; ½ of N. W. ¼, sec. 13, T. 21, R. 8; S. E. ¼ of S. E. ¼, sec. 13, T. 21, R. 8; 170 acres out of sec. 20, T. 21, R. 9.	Clay County.
July 2, 1877	W. S. Dean	E ½ of S. W. ¼, sec. 16, T. 20, R. 8.....	Do.
Oct. 1, 1877	A. B. Clements	W. ½ of S. W. ¼, sec. 4, T.18, R. 9 W.; N. ½ of S. E. ¼, sec. 4, T. 18, R. 9 W.; N. E. ¼ of S. W. ¼, sec. 4, T. 18, R. 9 W.	Tuscaloosa County.
Oct. 1, 1877	Thomas T. Dunn.....	S. W. ¼ of S. W. ¼, sec. 17, T. 17, R. 8 W.; E. ½ of S. W. ¼, sec. 17, T. 17, R. 8 W.; W. ½ of S. W. ¼, sec. 18, T. 17, R. 8W.; N. E. ¼ of N. W. ¼, sec. 19, T. 17, R. 8 W.; W. ½ of N. E. ¼, sec. 19, T. 17, R. 8 W.; N. E. ¼ of N. E. ¼, sec. 19, T. 17, R. 8 W.; S. E. ¼ of S. E. ¼. sec. 19, T. 17, R. 8 W.; W. ½ of N. W. ¼, sec. 19, T. 17, R. 8 W.; S. E. ¼ of N. W. ¼. sec. 19, T. 17, R. 8 W.; W ½ of S. W. ¼, sec. 20, T. 17, R. 8 W.; S. E. ¼ of S. W. ¼, sec. 13, T. 17, R. 9 W.; S. W. ¼ of N. E. ¼, sec. 13, T. 17. R. 9 W.; W. ½ of S. E. ¼, sec. 13, T. 17, R. 9 W.; E. ½ of N. W. ¼, sec. 24, T. 17, R. 9 W.; N. E. ¼ of S. E. ¼, sec. 24, T. 17, R. 9 W.; N. W. ¼ of N. E. ¼, sec. 24, T. 17, R. 9 W.	Do.
July 2, 1877	Pleasant G. Brandon..	N. W. ¼ of S. E. ¼, sec. 4, T. 19, R. 12 W.; N. W. ¼, sec. 4, T. 19, R. 12 W.	Randolph County.
Oct. 1, 1877	H. W. Jones.....	N. W. ¼ of N. W. ¼, sec. 1, T. 18, R. 10 W.; S. E. ¼ of N. E ¼, sec. 1, T. 18, R. 10 W.; N. W. ¼ of N. E. ¼, sec. 1, T.18, R. 10 W.; S. W. ¼ of N. E. ¼, sec. 1, T. 18, R. 10 W.; N. E. ¼ of S. W. ¼, sec. 15, T. 18, R. 10 W.; E. ½ of S. E. ¼, sec. 36, T. 18, R. 10 W.; S. W. ¼ of S. E. ¼, sec. 36, T. 18, R. 10 W.; S. E. ¼ of S E. ¼, sec. 35, T. 17, R. 10 W.; S. ½ of S. W. ¼, sec. 36, T. 17, R. 10 W.	Tuscaloosa County.
Oct. 1, 1877	John C. Christian.....	S. ½ of N. E. ¼ of N. E ¼, sec. 20, T. 18, R. 10 W.; S. ½ of N. E. ¼, sec. 20, T. 18, R. 10 W.; W. ½ of N. E. ¼, sec. 20, T. 18, R. 10 W.; N. W. ¼, sec 20, T. 18, R. 10 W.; N. W. ¼ of S. W. ¼, sec. 20, T. 18, R. 10 W.	Do.
Oct. 1, 1877	Daniel Boltin	S. W. ¼ of N. W. ¼, sec. 29, T. 17, R. 8 W.; W. ½ of S. W. ¼, sec. 29, T. 17, R. 8 W.; N. E. ¼ of S. E. ¼, sec. 30, T. 17, R. 8 W.	Do.
Oct. 1, 1877	W. T. Dunn	S. E. ¼ of N. E ¼, sec. 28, T. 17, R. 9 W.; N. E. ¼ of S. E. ¼, sec. 28, T. 17, R. 9 W.; N. ½ of S. W. ¼, sec. 28, T. 17, R. 9 W.; N. W. ¼ of N. W. ¼, sec. 28, T. 17, R. 9 W.; S. W. ¼ of N. W. ¼, sec. 28, T. 17, R. 9 W.; W. ½ of N. E. ¼, sec. 28, T. 17, R. 9 W.; S. E. ¼ of N. E. ¼, sec. 29. T. 17, R. 9 W.; N. E. ¼ of S. E. ¼, sec. 29, T. 17, R. 9 W.; S. ½ of S. E. ¼, sec. 29, T. 17, R. 9 W.; S. W. ¼ of N. E. ¼, sec. 29, T. 17, R. 9 W.	Do.

Statement of real property belonging to the United States, &c.—Continued.

ALABAMA—Continued.

When acquired.	From whom acquired.	Tracts or lots of land.	Where situated.
Oct. 1, 1877	William Dunn.....	S. W. ¼ of N. W. ¼, sec. 2, T. 18, R. 8 W.; S. E. ¼ of N. E. ¼, sec. 3, T. 18, R. 8 W.; W. ½ of N. E. ¼, sec. 3, T. 18, R. 8 W.; N. ½ of N. W. ¼, sec. 4, T. 18, R. 8 W.; W. ½ of N E. ¼, sec. 4, T. 18, R. 8 W.; S. E. ¼ of N. E. ¼, sec. 4, T. 18, R. 8 W.; W. ½ of S. E. ¼, sec. 4, T. 18, R. 8 W.; N. ½ of S. W. ¼, sec. 5, T. 18, R. 8 W.; S. ½ of S. W. ¼, sec. 33, T. 17, R. 8 W.	Tuscaloosa County.
Oct. 1, 1877	S. C. Dunn.....	S. W. ¼ of S. E. ¼, sec. 34, T. 17, R. 9 W.; S. E. ¼ of S. W. ¼, sec. 34, T. 17, R. 9 W.; N. W. ¼, sec. 3, T. 18, R. 9 W.; N. W. ¼ of S. W. ¼, sec. 3, T. 18, R. 9 W.; W. ½ of N. E. ¼, sec. 4, T. 18, R. 9 W.; N. E. ¼ of S E. ¼, sec. 4, T. 18, R. 9 W.	Do.
Oct. 1, 1877	J. C. Brooks.....	S. E. ¼ of S. E. ¼, sec. 7, T. 17, R. 9 W.; S. W. ¼ of S. W. ¼, sec. 8, T. 17, R. 9 W.; N. W. ¼, sec. 12, T. 17, R. 10 W.; W. ½ of N. E. ¼, sec. 12, T. 17, R. 10 W.; W. ½ of N. E. ¼, sec. 12, T. 17, R. 10 W.; E. ½ of S. W. ¼, sec. 12, T. 17, R. 10 W.; W. ½ of S. E. ¼, sec. 12, T. 17, R. 10 W.; N. E. ¼ of S. E. ¼, sec. 12, T. 17, R. 10 W.; S. E. ¼ of N. E. ¼, sec. 12, T. 17, R. 10 W.; N. ½ of N. W. ¼ of N. W. ¼, sec. 24, T. 17, R. 10 W.; N. ½ of N. E. ¼ of N. W. ¼, sec. 24, T. 17, R. 10 W.; N. ½ of N. E. ¼ of N. E. ¼, sec. 24, T. 17, R. 10 W.	Do.
Oct. 1, 1877	J. H. Walton.....	N. ½ of S. E. ¼, sec. 10, T. 18, R. 10 W.; S. E. ¼ of N. W. ¼, sec. 15, T. 18, R. 10 W.; W. ½ of N. E. ¼, sec. 15, T. 18, R. 10 W.; N. ½ of S. E. ¼, sec. 15, T. 18, R. 10 W.	Do.
Oct. 1, 1877	John S. Swindle.....	S. W. ¼ of S. E. ¼, sec. 22, T. 18, R. 10 W.; S. W. ¼ of S. W. ¼, sec. 23, T. 18, R. 10 W.; N. W. ¼, sec. 27, T. 18, R. 10 W.; N. ½ of N. E ¼, sec. 27, T. 18, R. 10 W.; W. ½ of S. E. ¼, sec. 27, T. 18, R. 10 W.; S. W. ¼ of N. E. ¼, sec. 27, T. 18, R. 10 W.; E. ½ of N. E. ¼, sec. 28, T. 18, R. 10 W.	Do.
July 2, 1877	Holman Freeman.....	20 acres off of N. E. corner, sec. 35, T. 12, R. 14; S. E. ¼ of N. E. ¼, sec. 26, T. 12, R. 14; N. E. ¼ of S. E. ¼, sec. 26, T. 12, R. 14; S. E. ¼ of S. E. ¼, sec. 26, T. 12, R. 14.	Lowndes County.
July 2, 1877	Joseph H. Speed.....	A house and lot in town of Marion	Perry County.
1877	Daniel Carmichael....	S. E. ¼ of N. W. ¼, sec. 13, T. 4, R. 4 W.; N. E. ¼ of S. E ¼, sec. 13, T. 4, R. 24 W.; W. ½ of N. E. ¼, sec. 13, T. 4, R. 24 W.; E. ½ of N. E. ¼, sec. 16, T. 4, R. 26 W.; W. ½, sec. 19, T. 4, R. 25 W.	Dale County.
1877	Eugene Beebee.....	Undivided half of lot and storehouse No. 41 Market street; lot and building No. 16 Perry street; lot and building No. 28 Market street; lot and building on Perry street, between Market and Monroe streets.	Montgomery City.
		80 acres known as the Montgomery Race track. (See letter district attorney, June 29, 1881.)	Montgomery County.
Feb. 6, 1871	John R. Salter.....	W. ½ of S. E. ¼, sec. 14, T. 5, R. 17.....	Covington County.
Feb. 6, 1871	Josiah Jones.....	S. ½ of N. E. ¼, sec. 20, T. 3, R. 16.....	Do.
Apr. 15, 1880	W. J. O'Bannon.....	S. ½ S. W ¼, sec. 26, T. 3, R. 10; N. E. ¼ S. W. ¼, sec. 26, T. 3, R. 10; W. ½ S. E. ¼, sec. 26, T. 3, R 10; S. W. ¼ N. E. ¼, sec. 26, T. 3, R. 10; N. W. ¼ S. W. ¼, sec. 26, T. 3, R. 10; S. E. ¼ N. W. ¼, sec. 11, T. 2, R. 10; S. W. ¼ N. W. ¼, sec. 11, T. 2, R. 10; N. W. ¼ N. W. ¼, sec. 34, T. 2, R. 10; N. E. ¼ N. W. ¼, sec. 34, T. 2, R. 10; part of S. W. ¼, sec. 35, T. 3, R. 10; N. W. ¼, sec. 14, T. 2, R. 10; S. E. ¼ N. E. ¼, sec. 21, T. 2, R. 10; S. W. ¼, sec. 23, T. 3, R. 10; S. ½ N. E. ¼, sec. 23, T. 3, R. 10; S. W. ¼ N. E. ¼, sec. 23, T. 3, R. 10; N. E. ¼ N. W. ¼, sec. 26, T. 3, R. 10; N. W. ¼ S. W. ¼, sec. 26, T. 3, R. 10; S. W. ¼ S. W. ¼, sec. 35, T. 3, R. 10; N. E. ¼ S. E. ¼, sec. 36, T. 3, R. 10; S. E. ¼ N. E. ¼, sec. 31, T. 1, R. 9; sec. 26, T. 3, R. 9; W. ½ S. W. ¼, sec. 34, T. 2, R. 10; part S. W. ¼	Escambia County.

Statement of real property belonging to the United States, &c.—Continued.

ALABAMA—Continued.

When acquired.	From whom acquired.	Tracts or lots of land.	Where situated.
Apr. 15, 1880	W. J. O'Bannon	S. W. ¼, sec. 32, T. 2, R. 10; part N. W. ¼ S. W. ¼ sec. 32, T. 2, R. 10; part N. E. ¼ S. W. ¼, sec. 32, T. 2, R. 10; S. E. ¼ S. W. ¼, sec. 32, T. 2, R. 10; 10-acre lot in town of Brewton, known as the old mill lot; lot 9 in block 15, in town of Brewton; steam sawmill on Murder Creek, on part of above described lands.	Escambia Counry.

ARKANSAS.

Dec. 10, 1856	Thomas J. Gates.....	S. E. ¼ of N. W. ¼ sec. 33, T. 3 N., R. 30 W.	Scott County.
Apr. 10, 1839	John McFadon	N. E. ¼ sec. 14, T. 10 N., R. 5 W	Jackson County.
		S. E. ¼ sec. 11, T. 8 N., R. 6 W.; N. E. ¼ sec. 11, T. 6 N., R. 9 W.; N. W. ¼ sec. 11, T. 6 N., R. 9 W.	White County.
		N. E. ¼ sec. 13, T. 4 N., R. 2 E.; S. W. ¼ sec. 33, T. 7 N., R. 1 E.	Saint Francis County.
		S. W. ¼ sec. 33, T. 2 N., R. 4 E.....	Phillips County.
		N. W. ¼ sec. 36, T. 11 N., R. 4 W.....	Independence County.
		N. W. ¼ sec. 25, T. 16 N., R. 3 W.....	Lawrence County.
		N. W. ¼ sec. 11, T. 5 N., R. 11 W.; N. E. ¼ sec. 25, T. 4 N., R. 12 W.; N. W. ¼ sec. 25, T. 4 N., R. 12 W.	Pulaski County.
		S. W. ¼ sec. 6, T. 6 N., R. 13 W.; N. E. ¼ sec. 33, T. 8 N., R. 13 W.	Conway County.
May 6, 1845	Wharton Rector	Lot 12, block 6.....	Rectortown, Pulaski County.
Dec. 15, 1845	Davis Thompson.....	S. E. ¼ sec. 11, T. 8 S., R. 1 W	Phelps County.
May 6, 1845	Wharton Rector	Lots 1, 2, 3, 4, 5, and 6, in frac. block 5 ...	Rectortown, Pulaski County.
Oct. 2, 1880	A. D. Thomas	S. ½ S. W. ¼ sec. 3, T. 6 N., R. 17 W.; N. W. ¼ S. W. ¼ sec. 3, T. 6 N., R. 17 W.; E. ½ N. E. ¼ sec. 4, T. 6 N., R. 17 W.; E. ½ S. E. ¼ sec. 4, T. 6 N., R. 17 W.; E. ½ N. E. ¼ sec. 9, T. 6 N., R. 17 W.; W. ½ N. W. ¼ sec. 10, T. 6 N., R. 17 W.; S. E. ¼ N. W. ¼ sec. 10, T. 6 N., R. 17 W.	Conway County.

COLORADO.

Aug. 31, 1880	F. M. Case.....	The undivided half of N. E. ¼ of S.W. ¼ sec. 2, T. 19 S., R. 68 W.	Fremont County.
		The undivided half of S. E. ¼ of N. E. ¼ sec. 19, T. 19 S., R. 68 W.; the undivided half of lots 1 and 2, block 31, city of Pueblo; the undivided third of E. ½ of N. E. ¼ sec. 14, T. 20 S., R. 65 W.; the undivided third of E. ½ of N. W. ¼ sec. 13 T. 20 S., R. 65 W.; the N. W. ¼ N. W. ¼ sec. 9, T. 22 S., R. 66 W.	Pueblo County.

DISTRICT OF COLUMBIA.

Mar. 24, 1858	Philip Barton Key, trustee of Robert Brent, deceased.	One-half of squares 710 and 711; the undivided one-third of the remaining half of squares 710 and 711, with the improvements thereon; all of squares 670, 671, and 672.	Washington City.
May 1, 1822	Robert Brent	The undivided one-third of 1 acre, 1 rood, and 39 perches.	Washington County.
Mar. 4, 1872*	S. S. Smoot	Lot 12, Kidwell's subdivision of square 217, with dwelling-house, &c.*	Washington City.
Mar. 27, 1877	George S. Balloch.....	Lot 11, block 6, and lot 14, block 10, in Howard University subdivision of farm of John S. Smith.	Do.
June 4, 1821	Lewis Deblois	Lots 1 and 2, square 948	Do.

Statement of real property belonging to the United States, &c.—Continued.

GEORGIA.

When acquired.	From whom acquired.	Tracts or lots of land.	Where situated.
Apr. 26, 1825	Robt. W. Pooler *et al*.	650 acres of land known as "Lithe."* Southern one-third and northern one-third of lot 10, Dixby ward.*	Chatham County. Savannah.

*Mortgage.

ILLINOIS.

Apr. 30, 1829	Bank of Edwardsville.	N. W. ¼ of sec. 8, T. 4 N., R. 1 W	Fayette County.
		S. E. ¼ of sec. 9, T. 2 N., R. 9 W	Saint Clair County.
		S. W. ¼ of sec. 6, T. 1 N., R. 2 W.; S. E. ¼ of sec. 1, T. 1 N., R. 3 W.	Clinton County.
		S. W. ¼ of sec. 12, T. 4 N., R. 2 W.; N. E. ¼ of sec. 13, T. 4 N., R. 2 W.; S E. ¼ of sec. 12, T. 4 N., R. 2 W.	Bond County.
Oct. 12, 1848	Elizabeth C. Duncan *et al.*	S. E. ¼ of sec. 4, T. 1 N., R. 2 W	Schuyler County.
Feb. 12, 1859	James M. Duncan.....	Lot 6, block 2, in Berlin; lot 7, block 2, in Berlin; lot 8, block 2, in Berlin; lot 2, block 4, in Berlin.	Sangamon County.
Nov. 1, 1848	Elizabeth C. Duncan *et al.*	S. W. ¼ of sec. 23, T. 3 N., R. 7 W	Hancock County.
Feb. 12, 1859	James M. Duncan	E. ½ of S. E. ¼ of sec. 8, T. 15 N., R. 11 W.; E. ¼ of N. E. ¼ of sec. 12, T. 15 N., R. 12 W.; N. W. frac. ¼ of sec. 7, T. 15 N., R. 11 W.	Morgan County.
Dec. 17, 1844	Joseph Duncan's heirs	N. E. ¼ of sec 33, T. 6, R. 4	McDonough County.
		S. E. ¼ of sec. 18, T. 5, R. 3; S. E. ¼ of sec. 7, T. 7, R. 4.	Fulton County.
		N. E. ¼ of sec. 28, T. 11, R. 1; N. E. ¼ of sec. 34, T. 10, R. 3.	Warren County.
		S. W. ¼ of sec. 35, T. 9, R. 4; S. E. ¼ of sec. 35, T. 9, R. 4; N. E. ¼ of sec. 21 T. 9, R. 5; N. W. ¼ of sec. 29, T. 11, R. 4.	Henderson County.
Oct. 14, 1859	Joseph Duncan's heirs	Sec. 7, T. 6 N., R. 1 W.; sec. 18, T. 16 N., R. 1 W.; sec. 12, T. 16 N., R. 2 W.; sec. 13, T. 16 N., R. 2 W.	Sangamon County.
Apr 10, 1839	John McFadon	S. E. ¼ sec. 8, T. 7 N., R. 4 E.....	Fulton County.
		S. W. ¼ sec. 20, T. 9 N., R. 4 W	Warren County.
		N. E. ¼ sec. 32, T. 15 N., R. 6 E	Bureau County.
Aug. 15, 1859	Benjamin Bond and James Weightman.	Part of E. ½ sec. 24, T. 1 N., R. 3 W.; N. W. ¼ sec. 16, T. 1 N., R. 2 W.; E. ½ of N. W. ¼ sec. 16, T. 2 N., R. 2 W.; W. ½ of S. E. ¼ sec. 23, T. 3 N., R. 2 W.; S. W. ¼ of N. W. ¼ sec. 29, T. 2 N., R. 2 W.; N. E. ¼ of N. W. ¼ sec. 23, T. 3 N., R. 2 W.; 10 lots, being all of block D, in Middletown, Carlyle; lot 117, block 14, Carlyle; lot 135, block 14, Carlyle; lot 60, block 9, Carlyle.	Clinton County.
Jan. 15, 1846	M. E. Rattan and T. Worthington.	Frac. E. side of E. ½ sec. 7, T. 4 S., R. 5 W.	Pike County.
Jan. 15, 1846	A. Langworthy	S. ½ of lot 117, in Windsor.....	Bureau County.
Jan. 15, 1846	H. Fellows and R. H. Burton.	N. W. ¼ sec. 35, T. 2 S., R. 4 W.; N. E. ¼ sec. 17, T. 2 S., R. 4 W.; frac. E. side of S. W. ¼ sec. 30, T. 1 N., R. 2 W.	Brown County.
Jan. 15, 1846	J. W. Casey and S. Field	Lot 6, block 2, in Pekin	Tazewell County.
Jan. 15, 1846	T. C. Brewer	Und. ½ of S. W. ¼ sec. 5, T. 6 N., R. 12 W.	Jersey County.
Jan. 15, 1846	James Macpherson ...	E. ¼ S. E. ¼ sec. 18, T. 16 N., R. 4 W	Rock Island County.
Dec. 30, 1846	O. W. Kellogg	Blocks 9 and 10, in Buffalo; part of sec. 17, T. 23, R. 8 E.	Ogle County.
Dec. 21, 1837	John B. F. Russell....	E. ½ sec. 33, T. 35, R. 6; E. ½ sec. 28, T. 35, R. 6; S. E. ¼ sec. 4, T. 33, R. 9.*	Cook County.
Oct. 10, 1845	Sureties of James W. Stephenson.	W. ½ of S. W. ¼ sec. 36, T. 35, R. 1 E....	La Salle County.
Dec. 8, 1876	John E. Rosette	Lot 5, block 2; N. ½ of lot 6, block 2, in N. Hickox's addition to the city of Springfield.	Sangamon County
		S. ½ of N. W. ¼ sec. 34, T. 3 S., R. 6 E ..	Clay County.
Mar. 18, 1857	Jesse Hoyt	N. E. ¼ sec. 30, T. 2 N., R. 5 W	Adams County
		N. E. ¼ sec. 13, T. 12 N., R. 7 E.....	Stark County.
Apr. 5, 1877	David Slankard.....	N. ½ of N. E. ¼ sec. 26, T. 13, R. 5 E.; S. ½ of S. E. ¼ sec. 26, T. 13, R. 5 E.; S. W. ¼ of S. E. ¼ sec. 23, T. 13, R. 5 E.; S. E. ¼ of S. E. ¼ sec. 23, T. 13, R. 5 E.; S. E. ¼ of S. W ¼ sec. 23, T. 13, R. 5 E.; S. E. ¼ of S. E. ¼ sec. 33, T. 13, R. 5 E.	Pope County.

* Mortgage.

Statement of real property belonging to the United States, &c—Continued.

ILLINOIS—Continued.

When acquired.	From whom acquired	Tracts or lots of land.	Where situated.
Mar. 20, 1879	Parnel Munson	Lots 67, 68, 69, 70, and 71 in Walker's subdivision of S. ½ of N. W. ¼ block 11; canal trustees' subdivision of E. ½ of sec. 31, T. 39, R. 14 E.	Cook County.
June 4, 1859	Sureties of Edward Moran.	The undivided ¼ of S. E. ¼ sec. 34, T. 13 N., R. 3 W.; E. ½ of S. W. ¼ sec. 34, T. 13 N., R. 3 W.; N. W. ¼ of S. W. ¼ sec. 34, T. 13 N., R. 3 W.; E. ¼ of N. W. ¼ sec. 34, T. 13 N., R. 3 W.	Mercer County.
Apr. 9, 10, 1851	Joseph Smith.....	Lot 1, block 100, in Nauvoo; lots 2 and 3, block 104, in Nauvoo; lot 1, block 106, in Nauvoo; E. ½ of W. ½ of lot 4, block 106, in Nauvoo; lot 3, block 107, in Nauvoo; lot 2, block 111, in Nauvoo; lot 3 (ex. 75′ E. side) block 150, in Nauvoo; und. ⅘ of lots 1, 2, 3, and 4, block 97, in Nauvoo; und. ⅘ of lots 1, 2, 3, and 4, block 98, in Nauvoo; und. ⅘ of lots 1 and 2, block 99, in Nauvoo; und. ⅘ of lots 2 and 3, block 109, in Nauvoo; und. ⅘ of lots 1, 2, 3, and 4, block 110, in Nauvoo; und. ⅘ of lot 3, block 111, in Nauvoo; lot 4, block 1, in Webster; lots 1, 2, 3, and 4, block 2, in Webster; lots 1, 2, 3, and 4, block 3, in Webster; lots 1, 2, and 4, block 5, in Webster; lot 4, block 7, in Webster; lots 1 and 4, block 9, in Webster; lot 1, block 10, in Webster; lot 4, block 13, in Webster; lot 4, block 18, in Webster; lot 4 block 20, in Webster; lots 3 and 4, block 21, in Webster; lot 2, block 22, in Webster; lot 4, block 23, in Webster; lots 2 and 3, block 4, in Webster; lots 2 and 4, block 12, in Webster; lot 2 (N. ½ of), block 7, in Webster; lot 1, block 20, in Webster; lot 2 (first addition), block 1, in Webster; lot 3 (first addition), block 1, in Webster; lot 1 (first addition), block 2, in Webster; lot 4 (first addition), block 2, in Webster; lots 1 and 4 (first addition), block 3, in Webster; fractional S. W. ¼ sec. 19, T. 6 N., R. 8; N. E. ¼ sec. 31, T. 5 N., R. 7; S. ½ of N. W. ¼ sec. 32, T. 3 N., R. 8; fractional N. E. ¼ of S. E. ¼ sec. 31, T. 6 N., R. 5; S. W. ¼ of sec. 10, T. 5 N., R. 8; N. E. ¼ of sec. 18, T. 6 N., R. 7; S. E. ¼ of sec. 18, T. 6 N., R. 7; S. W. ¼ of section 9, T. 6 N., R. 7; N. W. ¼ of sec. 22, T. 6 N., R. 7; N. W. ¼ of sec. 29, T. 6 N., R. 7; S. W. ¼ of sec. 34, T. 6 N., R. 7; S. E. ¼ of sec. 28, T. 6 N., R. 7; N. E. ¼ of sec. 35, T. 6 N., R. 7, S. E. ¼ of sec. 14, T. 6 N., R. 7; N. E. ¼ of sec. 9, T. 3 N., R. 6.	
Dec. 16, 1852	James W. Stephenson and sureties.	Lots 76, 77, 78, 79, 81, 83, 84, 85, 86, 87, and 88, on Gratiot and Brandt streets; lots 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, and 18, in block 28; undivided ½ of lot 17 in block 28; lots 1 and 2 in block 29; lot 2 in block 36; undivided ½ of lots 2 and 5 in block 40; lots 1 and 3 in block 41; lot 3 in block 42; undivided ½ of Eades's interest in lot 55; undivided ½ of lot 57—all in the city of Galena; S. W. ¼ sec. 21, T. 28 N., R. 1 E., 4th P. M.; N. W. ¼ sec. 21, T. 28 N., R. 1 E., 4th P. M.; N. W ¼ sec. 29, T. 28 N., R. 1 E., 4th P. M.; part of N. E. ¼ sec. 27 T. 28 N., R. 1 E., 4th P. M.; W. ½ of N. W. fractional ¼ sec. 18, T. 28 N., R. 1 W., 4th P. M. (excepting three-fifths of an acre conveyed to Ch. Bennett).	Jo Daviess County.
Aug. 22, 1853	A. G. S. Wight	Lots 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 18, 19, 20, 21, 22, 23, and 24, in blocks 6; lots 1, 2, 3, 10, 11, and 12, in block 5, in the city of Galena.	Do.

Statement of real property belonging to the United States, &c.—Continued.

ILLINOIS—Continued.

When acquired.	From whom acquired.	Tracts or lots of land.	Where situated.
Sept. 5, 1878	S. de Vries	N. E. ¼ sec. 17, T. 27, R. 2 E.; E. ½ of N. W. ¼ sec. 17, T. 27, R. 2 E.; part of W. ½ of N. W. ¼ sec. 17, T. 27, R. 2 E.; part of S. W. ¼ sec. 17, T. 27, R. 2 E.; E. ½ of N. W. ¼ sec. 20, T. 27, R. 2 E.	Woodford County.
1823	Bank of Missouri	345 acres of land on an island in the Mississippi River, about eight miles north of the city of Saint Louis, Mo.	Saint Clair County.
Nov. 15, 1878	Henry Wagner	Lots 11 and 13, in block 20, in Carpenter's addition to the city of Chicago.	Chicago, Cook County.
Aug. 20, 1880	John G. James	S. E. ¼, S. E. ¼, sec. 23, T. 7 N., R. 6 E.; part S. E. ¼, N. E. ¼, sec. 23, T 7. N. R., 6 E.; N. W. ¼, S. E. ¼ sec. 23, T. 7 N., R. 6 E.; W. ½, S. W. ¼ sec. 24, T. 7 N., R. 6 E.; S. W. ¼, N. W. ¼ sec. 24, T. 7 N., R. 6 E.; E. ½, N. E. ¼, S. W. ¼ sec. 31, T. 7 N., R. 6 E.; part S. W. ¼, N. E. ¼. sec. 26, T. 7 N., R. 6 E.; W. ½, S. E. ¼ sec. 31, T. 7 N, R. 6 E.	Effingham County.

INDIANA.

May 26, 1874	H. B. Shepard, W. J. Williams, W. B. Robinson, trustees of Bank of Vincennes.	Lots 9, 10, 15 of subdivision made by United States in 1881, of upper prairie survey, No. 5, T. 3 N., R 10 W. (Residue of lots remaining unsold under act March 3, 1881.)	Knox County.
Oct. 14, 1879	Cynthia A. Miles	S. ½ lots 69, Hendricks and Groves addition west to the city of Madison, with brick building thereon.	Jefferson County.

INDIAN TERRITORY.

Apr. 18, 1873	Florian H. Nash	A two-story storehouse, 26 by 75 feet, built of brick, and store and warehouse adjoining, of same dimensions, built of stone; said buildings being on lot 1, S. of R. 6, block A, in town of Fort Gibson, Cherokee Nation.	

IOWA.

June 2, 1862	Patrick Quigley *et ux.*	N. ½ of lot 157, sec. 26, within the corporate limits of Dubuque, containing 42 acres.*	Dubuque County.
Sept. 17, 1859	John Alexander	S. W. ¼ of S. W. ¼ sec. 14, T. 85 N., R. 10 W.; S. ½ of N. W. ¼ sec. 27, T. 85 N, R. 10 W.	Benton County.

KENTUCKY.

Apr. 24, 1834	James C. Wilson	1,572 acres of land on Kinnikinnic Creek.	Mason County.
Oct. 18, 1867	George Jones	5 acres of land on the old Litchfield road, about half a mile S. E. of Owensborough.	Daviess County.
Nov. 13, 1840	James H. Overstreet	A lot, 97 feet on Fulton street by 502 feet in depth to Elm street, in square No. 2, in Milford's enlargement to the city of Louisville.	Jefferson County.
June 26, 1879	John Dils, jr	140 acres of land	Pike County.

*Reserved from sale and annexed to Fort Sullivan by order of the President.

Statement of real property belonging to the United States, &c.—Continued.

MAINE.

When acquired.	From whom acquired.	Tracts or lots of land.	Where situated.
Oct. 7, 1830	L. and J. Hondelette ..	100 acres of land in Dresden	Lincoln County.
Mar. —, 1823	Henry Warren..... ...	57 acres, being four-sevenths of Dengley lot; one 50-acre lot; 100 acres, "being the strip lying south of the 50-acre lots,"—all in town of Winslow.	Kennebec County.
		Undivided ½ of lots 223 and 233 in town of Turner.	Oxford County.
Feb. 27, 1830	Jonathan Bartlett	Lot and two houses in Eastport	Washington County.
		Lot and store in Eastport *	Do.
May 14, 1822	Thomas Brintnall.....	¼ of an acre of land, late of Thomas Ransor, in town of Wiscasset.	Lincoln County.
		A tract of land with the improvements thereon, being the same land which was set off to Thomas Brintnall, on execution against Samuel Hubbard, in town of Wiscasset.	
1830	William Battie	103 acres in town of Appleton	Knox County.
1806	Jonathan Elwell.....	10 acres, with building thereon, in Northport.	Waldo County.
Feb. 8, 1881	S. B. Pool	3 lots in the city of Calais, with the store buildings thereon, corner Point and Milltown streets.	Washington County.

MARYLAND.

Apr. 17, 1877	F. C. Adams.....	Islands B and C, in the Potomac River, at Harper's Ferry (of little or no value).	

MICHIGAN.

May 28, 1845	Lucius Lyon.....	E. ½ of S. W. ¼ sec. 21, T. 4 N., R. 12 W..	Allegan County.
Dec. 31, 1837	John B. F. Russell	Lot 1, block 22, Ionia; lot 27, block 24, Ionia; lot 8, block 5, Ionia; lot 28, block 6, Ionia; lot 14, block 15, Ionia; lot 2, block 119, Ionia; lot 31, block 25, Ionia; lot 3, block 4, Ionia. †	Kalamazoo County.
Dec. 1, 1837	John B. F. Russell....	Blocks 5, 6, 8, 10, 15, 16, 17, 27, 32, 36, 38, 40, 42, 47, 59, and 60, in Centreville; lots 4, 5, and 6, in block 68, Centreville; lot 1, block 63, Centreville; lots 4 and 5, block 64, Centreville; part of S. E. ¼ of sec. 25, T. 6 S., R. 11 W.; part of S. E. ¼ of sec. 30, T. 6 S., R. 10 W.†	Saint Joseph County.
June 17, 1872	Richard and L. Suay..	North half of lot No. 29 and lot No. 30 in P. C. Andre's addition to the city of Saginaw.	Saginaw County.
Dec. 8, 1842	Bank of Michigan	Lot and banking-house, Detroit‡	Wayne County.
Sept. 7, 1858	Oliver M. Hyde.....	Lots 101, 102, and 103, and the river fronts thereof; lot 78 of section 8; lots 5, 7, 8, and 9, of block 6 of the "Cass farm," so called, and known as the Detroit Brewery property in Detroit.	Do.
Apr. 8, 1857	Olivia C. Hyde.....	"The Colonel Miller farm," so called, near the city of Detroit.	Do.
May 17, 1869	Robert C. Gorthy.....	N. W. ¼ of N. W. ¼, sec. 17, T. 6 N., R. 1 W.; E. ½ of N. W. ¼, sec. 17, T. 6 N., R. 1 W.	Clinton County.
May 17, 1869	Calvin E. Green	S. W. ¼ of N. W. ¼, sec. 17, T. 6 N., R. 1 W.; N. E. ¼ of S. E. ¼, sec. 18, T. 6 N., R. 1 W.	Do.

MINNESOTA.

Feb. 8, 1879	E. G. Hill.....	The undivided ½ of N. W. ¼, sec. 22, T. 39, R. 32, except a strip of 100 feet in width conveyed to the Western R. R. Co. for right of way.	Morrison County.

* Reserved from sale for custom-house by order of the President.

† Mortgage.

‡ Set apart for use of United States courts, post-office, &c., by joint resolution of Congress, March 3, 1843.

Statement of real property belonging to the United States, &c.—Continued.

MISSISSIPPI.

When acquired.	From whom acquired.	Tracts or lots of land.	Where situated.
Oct. 2, 1837	Wiley P. Harris	Lot 10 in square 3, Columbus	Lowndes County.
Apr. 27, 1840	Samuel T. Scott *et al*..	560 acres of land	Copiah County.
1839	Gordon D. Boyd	S. ½ of S. W. ¼, sec. 5, T. 14, R. 7.; W. ½ of N. W. ¼, sec. 21, T. 13, R. 7; E. ½ of S. W. ¼, sec. 21, T. 15, R. 6; N. W. ¼, sec. 8, T. 14, R. 7; N. E. ¼, sec. 21, T. 15, R. 6.	Attala County.
June —, 1875	E. C. Gillenwater.	Lot 12, block 49; block 427; lot 1, block 303; block 69—all in Mitchell and Mask's survey, Corinth; lot 98, block 7 Proper's Sub., Corinth; W. ½ of block 3 in Bell, Young, and McCord's survey, Corinth; block 203 West Corinth; S. E. ¼, sec. 35, T. 2, R. 7 E.	Alcorn County.
Aug. 21, 1848	Benj. A. Ludlow	W. ½ of S. W. ¼, sec. 30, T. 7 S., R. 10 W.; E. ½ of S. E. ¼, sec. 25, T. 7 S., R. 11 W., adjoining Mississippi City.	Harrison County.
Nov. 7, 1842	Hugh C. Stuart and Warren G. Jennings.	S. E. ¼ of sec. 1, T. 2, R. 1 W.; W. ½ of N. E. ¼, sec. 1, T. 2, R. 1 W.	Copiah County.
		W. ½ of N. E. ¼ of T. 5, R. 3 W	Hinds County.
June 13, 1844	Zachariah Rector.....	E. ½ N. E. ¼, sec. 13, T. 15, R. 7.....	Attala County.

MISSOURI.

July 16, 1830	James Kennie	1 lot, 150 feet front on Market street (north side) by 30 feet front on Fourth street in the city of Saint Louis.	Saint Louis County.
Apr. 20, 1827	Joseph Phillipson	Lot 3 in town laid off by J. C. Brown in 1817 for Bates, Smith & Lisa, adjoining the city of Saint Louis, being 60 feet in front by 170 feet in depth.	Do.
Apr. 15, 1829	Thomas and Charles S. Hempstead.	200 arpents of land	Calloway County.
		266⅔ arpents of land.....	Pike County.
		200 arpents of land.....	Lincoln County.
		160 arpents of land.....	Saint Charles County.
		121 arpents of land.....	Saint Louis County.
		⅔ of 200 arpents of land.....	Cole County.
		1 lot in city of Saint Louis	Saint Louis County.
Mar. 10, 1825	.....do	200 arpents of land, being half of a tract granted by the Spanish Government to Joseph Bles.	Washington County.
		160 acres on the waters of Sandy Creek, late of William Ewing.	Lincoln County.
		160 acres, being the undivided ¼ part of 640 acres, late of John Darey's	Montgomery County.
		320 acres, being the undivided ½ of 640 acres, late of John Darey's.	Chariton County.
Feb. 16, 1824	Thomas Brady.....	Undivided ½ of a lot fronting 40 feet on Third street by a depth of 75 feet, with building thereon, in the city of Saint Louis.	Saint Louis County.
Mar. 8, 1825	Angus L. Langhorn...	N. E. ¼ sec. 18, T. 45, R. 12; N. E. fr. ¼ sec. 19, T. 45, R. 12; N. W. fr. ¼ sec. 19, T. 45, R. 12; N. W. ¼ sec. 18, T. 45, R. 12; N. W. ¼ sec. 7, T. 45, R. 12; N. E. ¼ sec. 7, T. 45, R. 12; S. W. ¼ sec. 6, T. 45, R. 12.	Scotland County.
		N. E. fr. ¼ sec. 13, T. 46, R. 14; N. E. fr. ¼ sec. 24, T. 46, R. 14; S. E. fr. ¼ sec. 13, T. 46, R. 14; N. E. fr. ¼ sec. 1, T. 46, R. 14.	Schuyler County.
		S. E. fr. ¼ sec. 3, T. 45, R. 13; N. E. fr. ¼, sec. 3, T. 45, R. 13.	Scotland County.
May 29, 1829	George C. Sibley	800 arpents of land	Jefferson County.
Mar. 5, 1872	Peter W. Bowen	Undivided ½ of lot 36, with buildings thereon, on N. W. cor. of the public square, in town of Calhoun.	Henry County.
Sept. 1, 1879	Robert H. Hunt	Lots 7, 8, and 9, in block 8, in Rice's addition to the city of Kansas.	Jackson County.

Statement of real property belonging to the United States, &c.—Continued.

NEW HAMPSHIRE.

When acquired.	From whom acquired.	Tracts or lots of land.	Where located.
Apr. 19, 1880	T. S. Carter	One third of an acre of land in town of Hampstead, with buildings thereon. A tract of 26 acres in the town of Hampstead. Another tract in same town, with buildings thereon.	Rockingham County.

NEW JERSEY.

Aug. 23, 1833	Felix Peltier *et ux* ...	One-quarter interest (in common with F. G. Burnham, of Morristown, N. J.) in 30 acres of land in township of Rahway.	Essex County.
Dec. 5, 1835	Pierre Flandin *et ux* ..	Lots 235 and 237 in town of Somerville.	Somerset County.

NEW YORK.

Aug. 7, 1821	Hugh K. Toler.....	One lot, 50 by 330 feet, in Newburg	Orange County.
Mar. 18, 1857	Jesse Hoyt	Lot and premises No. 23 Pine street *..	New York City.

NORTH CAROLINA.

Sept. 25, 1820	Benjamin Smith *et ux*.	(Bald Head or Smith's Island), near the mouth of Cape Fear River; a tract of 3,840 acres known as Blue Banks; a tract of 3,000 acres called Mallory, situated on a creek of the same name.	Brunswick County.
May 17, 1834	Horace Ely *.....	A half-acre of land, and building thereon, at Plymouth.	Washington County.
Mar. 15, 1869	Levi Stevens *et ux*	A tract of 32,483 acres.....	Cherokee County.
Feb. 17, 1875	Wm. Barnwell *et ux*...	150 acres of land.....	Buncombe County.
		260 acres of land.....	Henderson County.
May 31, 1881	I. H. Neff	Lots 1, 2, 3, 4, 5, block 50 A; 1 and 2, block 77 M; 4 and 6, block 151; 4 block, 4 E, city of Wilmington.	New Hanover County.

PENNSYLVANIA.

Feb. 7, 1867	Cornelius Curtis	A tract of 391 acres of land in President Township, with buildings and improvements thereon; an island in Allegheny River, President Township, containing 45 acres.	Venango County.
		401 acres, Tionesta Township, with buildings and improvements thereon; 437 acres in Harmony Township; 81 acres in Tionesta Township.	Forest County.

* Reserved from sale by order of the President and set apart for custom-house.

Statement of real property belonging to the United States, &c.—Continued.

TENNESSEE.

When acquired.	From whom acquired.	Tracts or lots of land.	Where situated.
Jan. 4, 1870	Joseph P. Stotts	1,640 acres of land	Fentress County.
Jan. 30, and Feb. 3, 1858	James M. Riley	3,883 acres of land	Marion County.
		1,100 acres of land	Grundy County.
Jan. 16, 1860	Jacob H. Pennington	255 acres of land	Lawrence County.
June 24, 1868	W. H. Harris	Lot No. 20, fronting 25 feet on east side of Market street, between Third and Fourth streets, by a depth of 60 feet, Chattanooga.	Hamilton County.
May 2, 1879	Calvin Skull	44 acres of land three miles southwest of town of Purdy.	McNairy County.
Nov. 1, 1828	Andrew Irwin	1,500 acres of land near the forks of Duck River.	Bedford County.

TEXAS.

June 23, 1872	Joseph Bates *et ux*	1,476 acres of land	Live Oak County.
		4,605 acres of land	Eastland and Collahan counties.
		1,920 acres of land	Brown County.
Dec. 9, 1878	W. T. Scott	33,280 acres of land in the southwestern portion of the State.	Principally in Tom Green County.
Dec. 12, 1878	A. N. B. Tompkins	3,598 acres of land, known as the B. H. Hawkins head-right tract.	Hardin County.

VERMONT.

Mar. 31, 1817	Thaddeus Tuttle	Lot No. 39 in third division, containing 100 acres.	Chittenden County.
Feb. 1, 1817	....do	Part of 5-acre lot No. 67, in Burlington.	Do.
Sept. 27, 1817	Elnathan Keyes	Part of lot No. 181, 19 by 74 feet; part of lot No. 181, 17 by 74 feet; part of lot No. 181, 10 by 74 feet; part of lot No. 181, 163 by 74 feet, in Burlington.	Do.
Dec. 9, 1818	Levi Caldwell *et al*	Lots 181, 182, 183, 184, and 185, containing $\frac{1}{4}$ acre each, excepting a tract out of the S. W. corner of lot 181, comprising in all $1\frac{132}{1000}$ acres; and parts of lots Nos. 3, 19, 110, 111, and 112, in Burlington.	Do.
Apr. 29, 1819	Elnathan Keyes	Lot No. 150 (100 acres), and E. $\frac{1}{2}$ of lot 151 (50 acres), in town of Georgia.	Franklin County.
May 11, 1819	....do	Part of lot No. 25, containing 33 acres, in Burlington.	Chittenden County.
Sept. 18, 1819	Luke Dewing and Asa Bulkley.	N. $\frac{1}{2}$ of lot No. 51 (about 54 acres); part of lot No. 62 (about 15 acres), in town of Sheldon.	Franklin County.
1852	L. Clemmens *et al*	100 acres of land in town of Hyde Park.	Lamoille County.

VIRGINIA.

May 1, 1822	Robert Brent	20 acres of land (a stone quarry) on an island in the Potomac opposite Aquia.	Stafford County.
May 3, 1839	W. H. Dundas	Lot No. 21 on Queen street, plot E, 30 by 67 feet, in Alexandria; lot No. 18, on Water street, plot D, 27 by 123 feet, in Alexandria.	Alexandria County.

Statement of real property belonging to the United States, &c.—Continued.

WEST VIRGINIA.

When acquired.	From whom acquired.	Tracts or lots of land.	Where situated.
Apr. 17, 1877	Harper's Ferry Water Power Company and Francis C. Adams.	The water-power entire of the Potomac River, site of old armory buildings, and all that strip and bluff of land bordering on the Potomac and lying between the river and the streets and lots as laid down on the map of 1869, at Harper's Ferry.	Harper's Ferry, Jefferson County.
Apr. 17, 1877	.....do	The water-power entire of the Shenandoah River, the site of the old rifle factory at Harper's Ferry.	Do.
*July 29, 1878	John Wilson.....	Lot 5, north of Shenandoah street.....	Do.
*Aug. 7, 1878	N. Marmion	Lot 5, block I, on Shenandoah street...	Do.
*Sept. 23, 1878	Z. Butt's heirs	Lot 6, block J, on Union Square	Do.
*July 30, 1878	Daniel Ames.....	Lots 10, 11, 12, and 13, block J, on Union Square, and lots 1, 2, 3, and 4, block Q.	Do.
*Sept. 12, 1878	W. A. Winters.....	Lot 5, block Q	Do.
*July 30, 1878	Daniel Ames.....	Lots 8, 15, 17, and 18, block Q.....	Do.
*Sept. 12, 1878	W. A. Winters.....	Lot 20, block Q	Do.
*July 30, 1878	Daniel Ames.....	Lot 1, block R	Do.
*Aug. 7, 1878	N. Marmion	Lots 2 and 3, block R.....	Do.
*July 22, 1878	John L. Walsh.....	Lot 5, block R	Do.
*Aug. 7, 1878	N. Marmion	Lot 6, block R	Do.
*July 30, 1878	Daniel Ames.....	Lots 7 and 8, block R.....	Do.
*Sept. 24, 1878	David M. King.....	Lot 2, block S.....	Do.
*July 30, 1878	Daniel Ames.....	Lots 3 and 4, block S.....	Do.
*Aug. 12, 1878	E. A. Chambers	Lot 5, block S.....	Do.
*Oct. 1, 1878	Mary A. Percival	Lots 1 and 3, block U	Do.
*Sept. 12, 1878	W. A. Winters.....	Lots 1, 2, 3, 4, and 5, block V.....	Do.
	Francis Gannon.....	Lot 3, block 2	Do.
*Aug. 7, 1878	N. Marmion	Lot 6, block 2	Do.
*July 22, 1878	John L. Walsh.....	Lot 2, block BB.....	Do.
*Oct. 9, 1878	Charles E. Beller.....	Lot 3, block BB.....	Do.
*Aug. 3, 1878	Louisa Evans	Lot 7, block LL.....	Do.
*Oct. 11, 1878	Mrs. D. H. Erwin.....	Lots 8 and 9, block LL.....	Do.
*July 30, 1878	Daniel Ames.....	Lots 10 and 11, block LL.....	Do.
†June 15, 1796	John Wager *et al*	Lot 2, block B, on Shenandoah street; lot 6, block N, on Shenandoah street.	Do.
†July 1, 1847	G. B. Wager	Lot 18, Wager 6-acre reservation	Do.
†Mar. 7, 1848	A. Kennedy.....	Lot 23, Wager 6-acre reservation	Do.
†June 8, 1847	N. H. Swayne	Lot 28, Wager 6-acre reservation	Do.
†Feb. 20, 1797	T. Rutherford.....	Lots 10 and 12, block I, Camp Hill; lot 10, block P.	Do.
†1796–'97	Grantees of Robert Harper.	Lots 7, 9 and 10, block A A; lots 5, 8, 9 and 10, block B B; lots 2 and 4, block CC; lots 4 and 5, block DD; lots 3 and 1, block EE.	Do.
†Feb. 20, 1797	T. Rutherford.....	Lots 9, 12 and 13, block JJ; lots 5, 9, 10, 11 and 12, block KK.	Do.

WISCONSIN.

Oct. 10, 1845	Sureties of James W. Stephenson.	E. ½ of S. E. ¼ sec. 7, T. 4 N., R. 4 E., 4th P. M.	Iowa County.
Feb. 16, 1869	.....	E. ½ of S. E. ¼ sec. 30, T. 4 N., R. 4 E., 4th P. M.; undivided ½ of E. ½ of N. W. ¼ sec. 29, T. 4 N., R. 4 E., 4th P. M.; undivided ½ of W. ½ of S. W. ¼ sec. 29, T. 4 N., R. 4 E., 4th P. M.; also, all the interest of Stephenson in E. ½ of S. W. ¼ sec. 11, T. 1 N., R. 1 E., 4th P. M.; W. ½ of S. E. ¼ sec. 11, T. 1 N., R. 1 E., 4th P. M.; N. E. ¼ sec. 23, T. 1 N., R. 1 E., 4th P. M.; E. ½ of S. E. ¼ sec. 24, T. 1 N., R. 1 E., 4th P. M.	La Fayette County.
Feb. 16, 1869	J. D. Reymert *et ux*...	S. W. ¼ of sec. 12, T. 29 N., R. 20, near the city of Hudson.	Saint Croix County.
		S. ½ of S W. ¼ sec. 24, T. 47, R. 14; lots Nos. 166 and 467 in town of Superior.	Douglas County.

* Subject to sale under act of June 14, 1878.

† Subject only to lease by Solicitor of the Treasury under act of June 14, 1878, as not reacquired from the purchasers at the sale of 1869.

Statement of real property belonging to the United States, &c.—Continued.

WISCONSIN—Continued.

When acquired.	From whom acquired.	Tracts or lots of land.	Where situated.
*Dec. 21, 1837	John B. F. Russell....	Lot 4, block 3; lot 4, block 5; lots 2 and 3, block 12; lots 5 and 6, block 28; lots 7, 8, 9, 10, 11 and 12, block 32; lot 2, block 43; lot 5, block 56; lot 4, block 61; whole of block 6; whole of block 10; whole of block 52—all in town of Lyons.*	Milwaukee County.
		Lots 7, 8, 9, 10, 11, and 12, block 6; lots 7, 8, 9, 10, 11, and 12, block 15; lots 11 and 12, block 37; lots 1 and 2, block 38; lot 4, block 39; lots 6, 7, 8, 9, and 10, block 53; lots 6, 7, 8, 9, and 10, block 69; lots 1 and 2, block 56; whole of block 13; whole of block 71—all in Wisconsin Land Company's addition to Helena.*	Do.
Sept. 8, 1855	Sureties of A. B. Field.	S. W. $\frac{1}{4}$ sec. 27, T. 4, R. 3 E.; S. $\frac{1}{2}$ of N. W. $\frac{1}{4}$ sec. 27, T. 4, R. 3 E.; undivided $\frac{1}{3}$ of S. E. $\frac{1}{4}$ sec. 27, T. 10, R. 5 W.	La Fayette County.

* Mortgage.

No. 1.—*Report of suits on Treasury transcripts, other than post-office cases, instituted during the fiscal year ending June 30, 1881, in the several United States courts, and of proceedings had during said period in suits which were instituted prior thereto.*

Judicial district.	In suits brought during the fiscal year.								In suits brought prior to the fiscal year.								
	Number of suits.	Aggregate sued for.	Aggregate in judgment.	Collections.	Decided for the United States.	Decided against the United States.	Settled, dismissed, &c.	Pending.	Judgments in old suits.	Collections in old suits.	Decided for the United States.	Decided against the United States.	Settled, dismissed, &c.	Whole number of suits disposed of.	Whole number of judgments for United States during the year.	Total judgments.	Total collections.
Alabama, northern district																	
Alabama, middle district																	
Alabama, southern district	1	$6,394 50	$9,372 98		1									1	1	$9,372 98	
Arkansas, eastern district																	
Arkansas, western district																	
California	10	35,676 25		$3,720 69			3	7	$52 49	$2,238 29	1			4	1	52 49	$5,958 98
Colorado																	
Connecticut										1,321 10							1,321 10
Delaware									10,195 10	691 93	2			2	2	10,195 10	691 93
Florida, northern district										600 00							600 00
Florida, southern district																	
Georgia																	
Illinois, northern district	2	767 27		109 65				2									109 65
Illinois, southern district	1	852 46						1									
Indiana													1	1			
Iowa	3	8,147 31						3		373 68			3	3			373 68
Kansas	5	35,608 03						5	2,204 88	1,375 37	3			3	3	2,204 88	1,375 37
Kentucky										8,696 27			1	1			8,696 27
Louisiana, eastern district	12	97,754 21	60,814 21	5,967 33	4		2	6	10,304 42	4,689 44	1	2		9	5	71,118 63	10,656 77
Louisiana, western district																	
Maine									270 17	283 75	1			1	1	270 17	283 75
Maryland										4,712 24							4,712 24
Massachusetts	4	106,801 65		1,314 81			2	2	319 37	333 03	1	1		4	1	319 37	1,647 84
Michigan, eastern district	2	1,903 19						2									
Michigan, western district										1,045 30							1,045 30
Minnesota																	
Mississippi, northern district																	
Mississippi, southern district																	
Missouri, eastern district	1	4,055 15						1	7,769 14	2,268 47	2			2	2	7,769 14	2,268 47
Missouri, western district																	
Nebraska	2	1,811 47						2		3,500 00			1	1			3,500 00
Nevada																	
New Hampshire																	
New Jersey																	

New York, northern district																		
New York, southern district	1	1,000 00					1			12,261 68				1			12,261 68
New York, eastern district										500 00							500 00
North Carolina, eastern district	1	8,161 79	8,067 00		1					466 37				1	1	8,067 00	466 37
North Carolina, western district									20,514 53	100 85	1			1	1	20,514 53	100 85
Ohio, northern district										8,049 34							8,049 34
Ohio, southern district	1	8,633 61						1	296 00	354 21	1			1	1	296 00	354 21
Oregon										210 64		2	1	3			210 64
Pennsylvania, eastern district	7	27,809 50	14,737 00	478 54	1		2	4	7,156 52	7,207 54	1			4	2	21,893 52	7,686 08
Pennsylvania, western district	4	41,834 21						4									
Rhode Island																	
South Carolina																	
Tennessee, eastern district									421 91	50 00	1			1	1	421 91	50 00
Tennessee, middle district										1,930 20							1,930 20
Tennessee, western district									639 97	639 97	1			1	1	639 97	639 97
Texas, northern district									81 00	1,269 00	1			1	1	81 00	1,269 00
Texas, eastern district									16,893 08	1,290 97	3			3	3	16,893 08	1,290 97
Texas, western district	1	14,170 20						1	7,763 81	1,248 49	1			1	1	7,763 81	1,248 49
Vermont[1]										1,998 59			1	1			1,998 59
Virginia, eastern district																	
Virginia, western district																	
West Virginia	1	5,939 45						1		291 93			1	1			291 93
Wisconsin, eastern district	1	4,370 19						1									
Wisconsin, western district	1	792 06						1	2,214 71		1		1	2	1	2,214 71	
Arizona	2	5,757 26						2									
Dakota	1	1,572 50						1		308 96							308 96
Idaho																	
Montana	1	42 10	42 10	56 29	1									1	1	42 10	56 29
New Mexico	1	108 48		137 73			1							1			137 73
Utah																	
Washington	1	431 32						1									
Wyoming	1	1,214 32	1,246 96		1				257 80	263 61	1			2	2	1,504 76	263 61
District of Columbia	4	66,869 49						4		1,176 29							1,176 29
Total	72	488,477 97	94,280 25	11,785 04	9		11	52	87,354 90	71,747 51	23	5	10	58	32	181,635 15	83,532 55

No. 2.—*Reports of post-office suits instituted during the fiscal year ending June* 30, 1881, *in the several United States courts, and of proceedings had during said period in suits which were instituted prior thereto.*

Judicial districts.	In suits brought during the fiscal year.								In suits brought prior to the fiscal year.					Whole number of suits disposed of.	Whole number of judgments for United States during the year.	Total judgments.	Total collections.
	Number of suits.	Aggregate sued for.	Aggregate in judgment.	Collections.	Decided for the United States.	Decided against the United States.	Settled, dismissed, &c.	Pending.	Judgments in old suits.	Collections in old suits.	Decided for the United States.	Decided against the United States.	Settled, dismissed, &c.				
Alabama, northern district	8	$4,098 40	.....	$109 75	1	.....	.....	7	.....	$323 25	.....	.....	.....	1	1	.....	$433 00
Alabama, middle district	3	2,997 89	$151 92	151 92	1	.....	.....	2	.....	.....	.....	.....	.....	1	1	$151 92	151 92
Alabama, southern district	1	.....	131 10	131 10	1	.....	.....	1	.....	.....	.....	.....	.....	1	1	131 10	131 10
Arkansas, eastern district	17	3,147 16	3,225 33	316 52	15	.....	1	1	.....	100 00	.....	.....	.....	16	15	3,225 33	416 52
Arkansas, western district	4	430 04	320 50	245 00	3	.....	.....	1	.....	.....	.....	.....	.....	3	3	320 50	245 00
California	1	3,715 17	.....	.....	.....	.....	.....	.....	$842 83	1,498 45	2	1	1	4	2	842 83	1,498 45
Colorado	12	1,371 31	864 14	864 14	4	.....	3	5	23,098 15	.....	1	.....	.....	8	5	23,962 29	864 14
Connecticut	1	2,565 10	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....
Delaware	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Florida, northern district	1	987 51	.....	.....	.....	.....	.....	1	.....	469 45	.....	.....	.....	.....	.....	.....	469 45
Florida, southern district	1	.....	17 85	17 85	1	.....	.....	.....	.....	.....	.....	.....	.....	1	1	17 85	17 85
Georgia	8	2,530 93	494 25	542 05	4	.....	.....	4	2,654 30	368 60	1	.....	.....	5	5	3,148 55	910 65
Illinois, northern district	11	.....	3,284 81	889 34	11	.....	.....	.....	.....	.....	.....	.....	.....	11	11	3,284 81	889 34
Illinois, southern district	2	229 92	130 19	.....	1	.....	.....	1	.....	.....	.....	.....	.....	1	1	130 19	.....
Indiana	1	.....	223 82	223 82	1	.....	.....	.....	.....	14 92	.....	.....	.....	1	1	223 82	238 74
Iowa	4	.....	612 73	.....	4	.....	.....	.....	.....	.....	.....	.....	.....	4	4	612 73	.....
Kansas	4	127 80	320 19	.....	4	.....	.....	.....	1,392 94	100 00	3	.....	.....	7	7	1,713 13	100 00
Kentucky	.....	.....	.....	.....	.....	.....	.....	.....	777 53	785 84	1	.....	.....	1	1	777 53	785 84
Louisiana, eastern district	2	108 03	187 67	187 67	2	.....	.....	.....	984 46	900 18	3	.....	.....	5	5	1,172 13	1,087 85
Louisiana, western district	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Maine	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Maryland	2	6,949 92	1 00	1 00	1	.....	.....	1	.....	30 00	.....	.....	.....	1	1	1 00	31 00
Massachusetts	1	9,394 50	9,887 62	9,887 62	1	.....	.....	.....	.....	.....	.....	.....	.....	1	1	9,887 62	9,887 62
Michigan, eastern district	.....	.....	.....	.....	.....	.....	.....	.....	473 02	.....	1	.....	.....	1	1	473 02	.....
Michigan, western district	.....	.....	.....	.....	.....	.....	.....	.....	.....	135 36	.....	.....	.....	.....	.....	.....	135 36
Minnesota	4	2,897 43	305 00	3,177 34	2	.....	1	1	.....	.....	.....	.....	.....	3	2	305 00	3,177 34
Mississippi, northern district	4	23 97	196 27	.....	4	.....	.....	.....	815 73	74 75	4	.....	.....	8	8	1,012 00	74 75
Mississippi, southern district	1	.....	27 00	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	1	1	27 00	.....
Missouri, eastern district	3	48 57	200 00	200 00	2	.....	.....	1	293 94	50 00	3	.....	.....	5	5	493 94	250 00
Missouri, western district	2	.....	392 25	176 25	2	.....	.....	.....	.....	.....	.....	.....	.....	2	2	392 25	176 25
Nebraska	2	468 80	120 60	120 60	1	.....	.....	1	119 37	.....	1	.....	.....	2	2	239 97	120 60
Nevada	2	24,000 00	24,211 70	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	2	2	24,211 70	.....

New Hampshire																	
New Jersey	3		700 00		3								3	3	700 00		
New York, northern district	1	5,991 91		5,000 00			1		400 00	500 00	1		2	1	400 00	5,500 00	
New York, southern district	16		6,777 62	5,777 62	16					2,409 66			17	16	6,777 62	8,187 28	
New York, eastern district	2	679 53	100 00	100 00	1		1						1	1	100 00	100 00	
North Carolina, eastern district	5	649 88	2,068 81	150 95	3		2		236 14	236 14	1		4	4	2,304 95	387 09	
North Carolina, western district	2	3,400 00	10 00		1		1						1	1	10 00		
Ohio, northern district	3		163 60	113 60	3				142 78	132 78	2		5	5	306 38	246 38	
Ohio, southern district	9	663 05	957 19		8		1			35 00			8	8	957 19	35 00	
Oregon																	
Pennsylvania, eastern district	12	26,991 65	5,250 00		5		1	6	572 67	207 91	2		9	7	5,822 67	207 91	
Pennsylvania, western district	2		277 75	272 75	2				197 83		1		3	3	475 58	272 75	
Rhode Island																	
South Carolina	3		300 00		3					162 05			3	3	300 00	162 05	
Tennessee, eastern district	1	78 26					1										
Tennessee, middle district									149 50	80 95	1		1	1	149 50	80 95	
Tennessee, western district										141 96			1	1		141 96	
Texas, northern district	3	314 70	478 56	26 10	3				1,402 94	114 19	3		6	6	1,881 50	140 29	
Texas, eastern district	2		300 00		2					150 35			2	2	300 00	150 35	
Texas, western district	1		300 00	300 00	1					2,271 64			1	1	300 00	2,571 64	
Vermont	2		115 38	10 00	2								2	2	115 38	10 00	
Virginia, eastern district	1	4,233 23		3,137 47				1								3,137 47	
Virginia, western district	1		416 26	416 26	1								1	1	416 26	416 26	
West Virginia	2		104 05	104 05	2				613 95	856 87	1		3	3	718 00	960 92	
Wisconsin, eastern district																	
Wisconsin, western district																	
Arizona																	
Dakota	6	12,147 53	13,105 07	8,003 56	3		2	1					5	3	13,105 07	8,003 56	
Idaho																	
Montana																	
New Mexico																	
Utah																	
Washington																	
Wyoming	1	478 57	556 32		1								1	1	556 32		
District of Columbia																	
Total	180	121,720 76	77,286 55	40,654 33	129		9	42	35,168 08	12,150 30	32	1	4	175	161	112,454 63	52,804 63

No. 3.—*Report of suits on custom-house bonds instituted during the fiscal year ending June* 30, 1881, *in the several United States courts, and of proceedings had during said period in suits which were instituted prior thereto.*

Judicial districts.	In suits brought during the fiscal year.								In suits brought prior to the fiscal year.					Whole number of suits disposed of.	Whole number of judgments for United States during the year.	Total judgments.	Total collections.
	Number of suits.	Aggregate sued for.	Aggregate in judgment.	Collections.	Decided for the United States.	Decided against the United States.	Settled, dismissed, &c.	Pending.	Judgments in old suits.	Decided for the United States.	Decided against the United States.	Settled, dismissed, &c.	Collections in old suits.				
California	1	84 72						1									
Connecticut												1	116 20	1			116 20
Florida, southern district									1,269 84	2			785 92	2	2	1,269 84	785 92
Illinois, northern district	1	252 44	261 50	303 00	1								6 22	1	1	261 50	309 22
Louisiana, eastern district									106,855 30	24	43	119		186	24	106,855 30	
Massachusetts	5	17,332 67					1	4	69 61	1		1	69 61	3	1	69 61	69 61
New Jersey									165 11	1				1	1	165 11	
New York, northern district											2			2			
New York, southern district	19	2,656 94	476 81	69 18	3		3	13	1,223 99	5		42	4,077 71	53	8	1,700 80	4,146 89
New York, eastern district	2	366 17						2	90 73	2				2	2	90 73	
Pennsylvania, eastern district	2	255 71						2	58,238 90	32	1	1	676 98	34	32	58,238 90	676 98
District of Columbia	1	72 16						1									
Total	31	21,020 81	738 31	372 18	4		4	23	167,913 48	67	46	164	5,732 64	285	71	168,651 79	6,104 82

No. 4.—*Report of suits for fines, penalties, and forfeitures under the customs-revenue laws, &c., instituted during the fiscal year ending June 30, 1881, in the several United States courts, and of proceedings had during said period in suits which were instituted prior thereto.*

Judicial districts.	In suits brought during the fiscal year.									In suits brought prior to the fiscal year.									
	Number of suits.	Aggregate sued for.	Aggregate in judgment.	Collections.	Decided for the United States.	Decided against the United States.	Settled, dismissed, &c.	Remitted.	Pending.	Judgments in old suits.	Collections in old suits.	Decided for the United States.	Decided against the United States.	Settled, dismissed, &c.	Remitted.	Whole number of suits disposed of.	Whole number of judgments for United States during the year.	Total judgments.	Total collections.
Alabama, northern district																			
Alabama, middle district																			
Alabama, southern district										100 00		1				1	1	100 00	
Arkansas, eastern district	2	1,000 00		26 30				1	1		22 95			1		2			49 25
Arkansas, western district																			
California	12	500 00	130 00	963 80	5		5		2							10	5	130 00	963 80
Colorado																			
Connecticut	4		100 00	251 87	1		1		2					1		3	1	100 00	251 87
Delaware																			
Florida, northern district	1							1			227 09					1			227 09
Florida, southern district														1		1			
Georgia																			
Illinois, northern district	1	500 00	100 00	121 75	1						65 50					1	1	100 00	187 25
Illinois, southern district										100 00		1				1	1	100 00	
Indiana																			
Iowa	2		300 00		2						30 00					2	2	300 00	30 00
Kansas																			
Kentucky																			
Louisiana, eastern district	4	900 00	100 00	85 00	2		2			1,000 00	25 00	1	1	2	1	9	3	1,100 00	110 00
Louisiana, western district																			
Maine	11	4,886 89		274 32	1		1	4	5							6	1		274 32
Maryland	3	100 00				1			2	210 00	41 75	2		2	1	6	2	210 00	41 75
Massachusetts	10	24,719 00	950 00	2,135 98	5		1		4		101 99		1	7	2	16	5	950 00	2,237 97
Michigan, eastern district	21	2,150 00	3,950 00	4,933 92	15			5	1		3,584 71			1		21	15	3,950 00	8,518 63
Michigan, western district	1	100 00							1		273 07								273 07
Minnesota																			
Mississippi, northern district																			
Mississippi, southern district	2	1,000 00							2										
Missouri, eastern district	5	1,650 00		10 00			1	2	2	200 00	9 88	2				5	2	200 00	19 88
Missouri, western district																			
Nebraska																			
Nevada																			
New Hampshire																			

No. 4.—*Report of suits for fines, penalties, and forfeitures under the customs-revenue laws, &c.*—Continued.

Judicial districts.	In suits brought during the fiscal year.									In suits brought prior to the fiscal year.						Whole number of suits disposed of.	Whole number of judgments for United States during the year.	Total judgments.	Total collections.
	Number of suits.	Aggregate sued for.	Aggregate in judgment.	Collections.	Decided for the United States.	Decided against the United States.	Settled, dismissed, &c.	Remitted.	Pending.	Judgments in old suits.	Collections in old suits.	Decided for the United States.	Decided against the United States.	Settled, dismissed, &c.	Remitted.				
New Jersey	2		150 00		1				1							1	1	150 00	
New York, northern district	8		700 00	1,463 58	8					500 00	365 00	1				9	9	1,200 00	1,828 58
New York, southern district	46	195,420 92		31,608 08	6		12	12	16	3,044 86	36,291 71	5		44	3	82	11	3,044 86	67,799 79
New York, eastern district	7	1,000 00	150 00	125 00	3				4	1,750 00		4		3		10	7	1,900 00	125 00
North Carolina, eastern district											25 50								25 50
North Carolina, western district																			
Ohio, northern district																			
Ohio, southern district	1		100 00		1								4	1		6	1	100 00	
Oregon											59 44				1	1			59 44
Pennsylvania, eastern district	5	700 00							5				1			1			
Pennsylvania, western district																			
Rhode Island																			
South Carolina													1			1			
Tennessee, eastern district																			
Tennessee, middle district																			
Tennessee, western district	1		100 00		1											1	1	100 00	
Texas, northern district																			
Texas, eastern district	1			1,139 15	1											1	1		1,139 15
Texas, western district	41		1,054 30	129 65	40				1	26 00	489 43	5				45	45	1,080 30	619 08
Vermont	1		50 00	50 00	1						1,771 47	1		1		3	2	50 00	1,821 47
Virginia, eastern district	1			745 96			1							13		14			745 96
Virginia, western district																			
West Virginia																			
Wisconsin, eastern district	8	900 00		28 48	3		2	3								8	3		28 48
Wisconsin, western district																			
Arizona																			
Dakota																			
Idaho																			
Montana																			
New Mexico													1			1			
Utah																			
Washington																			
Wyoming																			
District of Columbia																			
Total	201	235,526 81	7,934 30	44,092 84	97	1	26	28	49	6,930 86	43,384 49	23	9	77	8	269	120	14,865 16	87,477 33

No. 5.—*Report of suits against collectors of customs and other officers, instituted during the fiscal year ending June* 30, 1881, *in the several United States courts, and of proceedings had during said period in suits which were instituted prior thereto.*

Judicial districts.	In suits brought during the fiscal year.					In suits brought prior thereto.			Whole number of suits disposed of.	Whole number of judgments in favor of United States during the year.
	Number of suits.	Decided for the United States.	Decided against the United States.	Settled, dismissed, &c.	Pending.	Decided for the United States.	Decided against the United States.	Settled, dismissed, &c.		
Alabama, southern district	1	.....	.....	.....	1	.....	.....	.....	.....	.....
California	.....	.....	.....	.....	.....	.....	.....	1	1	.....
Illinois, northern district	2	.....	.....	.....	2	.....	.....	.....	.....	.....
Louisiana, eastern district	4	.....	2	.....	2	7	1	.....	10	7
Maryland	25	.....	.....	.....	25	.....	.....	2	2	.....
Massachusetts	48	.....	.....	.....	48	2	.....	19	21	2
Michigan, eastern district	.....	.....	.....	.....	.....	.....	.....	1	1	.....
New York, northern district	39	.....	.....	.....	39	.....	.....	.....	.....	.....
New York, southern district	712	.....	.....	38	674	31	16	689	774	31
Oregon	.....	.....	.....	.....	.....	1	.....	.....	1	.....
Pennsylvania, eastern district	52	.....	.....	.....	52	.....	1	.....	1	1
Vermont	5	.....	.....	.....	5	.....	.....	.....	.....	.....
Total	888	.....	2	38	848	41	18	712	811	41

No. 6.—*Report of miscellaneous suits instituted during the fiscal year ending June* 30, 1881, *in the several United States courts, and of proceedings had during said period in suits which were instituted prior thereto.*

Judicial districts.	In suits brought during the fiscal year.								In suits brought prior to the fiscal year.					Whole number of suits disposed of	Whole number of judgments for United States during the year	Total judgments.	Total collections.
	Number of suits.	Aggregate sued for.	Aggregate in judgment.	Collections.	Decided for the United States.	Decided against the United States.	Settled, dismissed, &c.	Pending.	Judgments in old suits.	Collections in old suits.	Decided for the United States.	Decided against the United States.	Settled, dismissed, &c.				
Alabama, northern district	50	$13,050 00	$1,042 00	.....	7	.....	15	28	$5,516 00	$100 00	28	.....	36	86	35	$6,558 00	$100 00
Alabama, middle district	97	350 00	927 00	$151 51	55	.....	37	5	616 75	1,272 33	5	.....	3	100	60	1,543 75	1,723 84
Alabama, southern district	46	17,150 00	290 00	270 60	24	.....	12	10	6,088 25	3,784 67	15	.....	1	52	39	6,378 25	4,055 27
Arkansas, eastern district	23	2,350 00	8,995 50	493 50	14	.....	4	5	.....	2,801 86	.....	.....	....	18	14	8,995 50	3,295 36
Arkansas, western district	137	16,350 00	13,740 00	685 30	121	.....	3	13	8,155 00	159 53	12	.....	4	140	133	21,895 00	844 83
California	16	1,000 00	1,758 00	26 00	15	.....	....	1	61 56	2,684 86	1	.....	1	17	16	1,819 56	2,710 86
Colorado	10	1,600 00	285 00	327 63	6	.....	....	4	10 00	5,242 41	1	.....	2	9	7	295 00	5,570 04
Connecticut	4	.....	503 00	.....	4	....	....	....	.....	116 26	.....	.....	2	6	4	503 00	116 26
Delaware	.....	.....	.....	.....	.....	.....	....	....	.....	.....	.....	.....	....	.....	.....	.....	.....
Florida, northern district	2	.....	.....	.....	.....	.....	....	2	.....	.....	.....	.....	....	.....	.....	.....	.....
Florida, southern district	2	250 00	25 00	44 18	1	.....	1	..	.....	150 00	.....	.....	....	2	1	25 00	194 18
Georgia	68	26,365 00	1,150 00	182 92	4	.....	21	43	2,600 00	743 08	9	.....	8	42	13	3,750 00	926 00
Illinois, northern district	26	8,600 00	4,166 00	156 67	20	.....	6	....	146 08	.....	3	.....	1	30	23	4,312 08	156 67
Illinois, southern district	8	.....	595 16	252 39	8	.....	....	....	.....	1,298 51	.....	.....	....	8	8	595 16	1,550 90
Indiana	12	2,853 33	173 00	20 00	10	.....	1	1	5 00	110 00	1	.....	...	12	11	178 00	130 00
Iowa	4	100 00	70 00	.....	3	1	....	....	419 00	44 40	3	.....	....	7	6	489 00	44 40
Kansas	10	300 00	453 00	43 90	10	.....	...	....	125 00	125 00	5	.....	....	15	15	578 00	168 90
Kentucky	5	123 42	22 00	132 64	4	.....	1	....	239 95	463 38	1	1	3	10	5	261 95	596 02
Louisiana, eastern district	2	.....	75 00	50 00	2	.....	....	....	310 04	2,810 65	10	.....	2	14	12	385 04	2,860 65
Louisiana, western district	.....	.....	.....	.....	.....	.....	....	....	.....	.....	.....	.....	....	.....	.....	.....	.....
Maine	5	5,168 83	8,593 93	.....	5	.....	..	....	.....	.....	.....	.....	....	5	5	8,593 93	.....
Maryland	7	.....	4,022 00	21 00	7	.....	....	....	50 00	50 00	1	1	....	9	8	4,072 00	71 00
Massachusetts	26	4,077 72	766 69	523 69	23	.....	....	3	1,092 97	1,407 55	4	.....	3	30	27	1,859 66	1,931 24
Michigan, eastern district	11	.....	7,452 00	275 00	11	.....	....	....	1,355 00	7,000 00	6	.....	....	17	17	8,807 00	7,275 00
Michigan, western district	17	2,027 00	6,318 84	5,897 37	12	.....	....	5	200 00	3,493 72	1	.....	3	16	13	6,718 84	9,391 09
Minnesota	15	.....	1,776 00	206 00	14	.....	....	1	25 00	236 88	1	.....	....	15	15	1,801 00	442 88
Mississippi, northern district	44	7,806 46	1,302 00	728 21	40	.....	3	1	30 00	99 56	3	.....	...	46	43	1,332 00	827 77
Mississippi, southern district	29	10,000 00	1,350 00	1,350 00	28	.....	....	1	520 00	200 00	1	.....	2	31	29	1,870 00	1,550 00
Missouri, eastern district	14	11,858 37	46 00	.....	10	.....	....	4	.....	.....	.....	.....	....	10	10	46 00	.....
Missouri, western district	12	.....	2,711 00	.....	11	.....	....	1	750 00	.....	4	.....	1	16	15	3,461 00	.....
Nebraska	7	.....	1,615 25	154 68	7	.....	....	....	4,697 00	132 30	1	.....	....	8	8	6,312 25	286 98
Nevada	.....	.....	.....	.....	.....	.....	....	....	8,501 00	800 56	9	1	3	13	9	8,501 00	800 56

New Hampshire	1	176 97						1										
New Jersey	9	2,100 00	2,501 00	85 95	7			2						7	7	2,501 00	85 95	
New York, northern district	25	2,520 27	3,915 00	690 00	22			3	100 00	100 00	1			23	23	4,015 00	790 00	
New York, southern district	51	17,851 62	338 00	5,549 06	22		13	16	16,430 08	18,487 22	4	1	32	72	26	16,768 08	24,036 28	
New York, eastern district	9	733 03	5 00		5		1	3					3	9	5	5 00		
North Carolina, eastern district	24	6,150 00				2	14	8	1,450 00		8	1	5	30	8	1,450 00		
North Carolina, western district	63	15,650 00	3,100 00		15		34	14	17,400 00		80	1	50	180	95	20,500 00		
Ohio, northern district	3	1,849 41	1,659 47	822 26	2			1						2	2	1,659 47	822 26	
Ohio, southern district	14	5,000 00	11,320 00		14				188 94	200 00	2			16	16	11,508 94	200 00	
Oregon	57		1,297 00	853 42	57					2,583 36				57	57	1,297 00	3,436 78	
Pennsylvania, eastern district	37	44,206 58	14,368 00	5 00	29			8	400 00	1,000 00	3	3	3	38	32	14,768 00	1,005 00	
Pennsylvania, western district	17	14,358 37	5,710 00	1,000 00	13			4	2,284 41	1,469 66	4	1	1	19	17	7,994 41	2,469 66	
Rhode Island																		
South Carolina	3		135 00	35 00	3									3	3	135 00	35 00	
Tennessee, eastern district	15	12,300 00					10	5	7,100 00		9		12	31	9	7,100 00		
Tennessee, middle district	35	170,600 00	3,125 00	17 70	8		4	23	20,500 00	548,570 06	41		26	79	49	23,625 00	548,587 76	
Tennessee, western district	19	5,175 00	850 00	11 76	6		11	2	500 00	330 80	1		1	19	7	1,350 00	342 56	
Texas, northern district	11	3,900 00	800 00		4		2	5	2,450 00		5		3	14	9	3,250 00		
Texas, eastern district	47	8,575 00	6,313 25		38		6	3	6,012 00	63 50	45		11	100	83	12,325 25	63 50	
Texas, western district	48	11,950 00	3,740 00	200 05	12	1	1	34	2,200 00	1,190 29	12		9	35	24	5,940 00	1,390 34	
Vermont	1	300 00		300 00			1							1			300 00	
Virginia, eastern district	1		5 00		1								1	2	1	5 00		
Virginia western district	15	3,900 00	3,101 00	1,015 98	11			4	2,300 00	15 45	9		6	26	20	5,401 00	1,031 43	
West Virginia	1		500 00	587 15	1				5,060 00		12		75	88	13	5,560 00	587 15	
Wisconsin, eastern district	59	7,576 00	383 75	1,871 77	19		34	6	1,642 03	2,514 93	1	1	1	56	20	2,025 78	4,386 70	
Wisconsin, western district	13	23,000 00	1,464 50	1,639 47	9			4	1,570 70	2,845 87	9		1	19	18	3,035 20	4,485 34	
Arizona												1		1				
Dakota	35	2,160 00	4,378 00	2,038 00	28			7	1,000 00	143 51	2			30	30	5,378 00	2,181 51	
Idaho	10	8,500 00					1	9		300 00			1	2			300 00	
Montana	3		100 00		1			2	250 00		1			2	2	350 00		
New Mexico	1		570 00		1				1,000 00		2			3	3	1,570 00		
Utah	1		250 00		1									1	1	250 00		
Washington	6		711 00	429 03	6				850 00	1,058 20	6			12	12	1,561 00	1,487 23	
Wyoming																		
District of Columbia	1	100 00						1										
Total	1,344	500,012 38	140,863 34	29,444 79	811	4	236	293	132,201 76	616,200 36	382	12	316	1,761	1,193	273,065 10	645,645 15	

No. 7.—*Statistical summary of business arising from suits, &c., in which the United States is a party or has an interest, under charge of the Solicitor of the Treasury, during the fiscal year ending June* 30, 1881.

Judicial districts.	In suits brought during the fiscal year ending June 30, 1881.												
	Suits on Treasury transcripts.		Post-office suits.		Suits on custom-house bonds.		Suits for fines, penalties, and forfeitures under the customs revenue laws.		Suits against collectors of customs, &c.	Miscellaneous suits.		Total amount reported sued for.	Total amount reported in judgment in favor of the United States.	Total amount reported collected.
	No.	Amount.	No.	Amount.	No.	Amount.	No.	Amount.	No.	No.	Amount.			
Alabama, northern district	....	.....	8	4,098 40	....	.....	....	.....	.....	50	13,050 00	17,148 40	1,042 00	109 75
Alabama, middle district	....	.....	3	2,997 89	....	.....	....	.....	.....	97	350 00	3,347 89	1,078 92	603 43
Alabama, southern district	1	6,394 50	1	.....	....	.....	....	.....	1	46	17,150 00	23,544 50	9,794 08	401 70
Arkansas, eastern district	....	.....	17	3,147 16	....	.....	2	1,000 00	.....	23	2,350 00	6,497 16	12,220 83	836 32
Arkansas, western district	....	.....	4	430 04	....	.....	....	.....	.....	137	16,350 00	16,780 04	14,060 50	930 30
California	10	35,676 25	1	3,715 17	1	84 72	12	500 00	.....	16	1,000 00	40,976 14	1,888 00	4,710 49
Colorado	....	.....	12	1,371 31	....	.....	....	.....	.....	10	1,600 00	2,971 31	1,149 14	1,191 77
Connecticut	....	.....	1	2,565 10	....	.....	4	.....	.....	4	.....	2,565 10	603 00	251 87
Delaware	....	.....	....	.....	....	.....	....	.....	.....	.....	.....	.....	.....	.....
Florida, northern district	....	.....	1	987 51	....	.....	1	.....	.....	2	.....	987 51	.....	.....
Florida, southern district	....	.....	1	.....	....	.....	....	.....	.....	2	250 00	250 00	42 85	62 03
Georgia	....	.....	8	2,530 93	....	.....	....	.....	.....	68	36,365 00	28,895 93	1,644 25	724 97
Illinois, northern district	2	767 27	11	.....	1	252 44	1	500 00	2	26	8,600 00	10,119 71	7,812 31	1,580 41
Illinois, southern district	1	852 46	2	229 92	....	.....	....	.....	.....	8	.....	1,082 38	725 35	252 39
Indiana	....	.....	1	.....	....	.....	....	.....	.....	12	2,853 33	2,853 33	396 82	243 82
Iowa	3	8,147 31	4	.....	....	.....	2	.....	.....	4	100 00	8,247 31	982 73	.....
Kansas	5	35,608 03	4	127 80	....	.....	....	.....	.....	10	300 00	36,035 83	773 19	43 90
Kentucky	...	.....	....	.....	....	.....	...	.....	.....	5	123 42	123 42	22 00	132 64
Louisiana, eastern district	12	97,754 21	2	108 03	....	.....	4	900 00	4	2	.....	98,762 24	61,176 88	6,290 00
Louisiana, western district	...	.....	....	.....	...	.....	....	.....	.....	.....	.....	.....	.....	.....
Maine	....	.....	....	.....	....	.....	11	4,886 89	.....	5	5,168 83	10,055 72	8,593 93	274 32
Maryland	...	.....	2	6,949 92	..	.....	3	100 00	25	7	.....	7,049 92	4,023 00	22 00
Massachusetts	4	106,801 65	1	9,394 50	5	17,332 67	10	24,719 00	48	26	4,077 72	162,325 54	11,604 31	13,862 10
Michigan, eastern district	2	1,903 19	....	.....	...	.....	21	2,150 00	.....	11	.....	4,053 19	11,492 00	5,208 92
Michigan, western district	....	.....	....	.....	....	.....	1	100 00	.....	17	2,027 00	2,127 00	6,318 84	5,897 37

Minnesota			4	2,897 43						15		2,897 43	2,081 00	3,383 34
Mississippi, northern district			4	23 97						44	7,806 46	7,830 43	1,498 27	728 21
Mississippi, southern district			1				2	1,000 00		29	10,000 00	11,000 00	1,377 00	1,350 00
Missouri, eastern district	1	4,055 15	3	48 57			5	1,650 00		14	11,858 37	17,612 09	246 00	210 00
Missouri, western district			2							12			3,103 25	176 25
Nebraska	2	1,811 47	2	468 80						7		2,280 27	1,735 85	275 28
Nevada			2	24,000 00								24,000 00	24,211 70	
New Hampshire										1	176 97	176 97		
New Jersey			3				2			9	2,100 00	2,100 00	3,351 00	85 95
New York, northern district			1	5,991 91			8		39	25	2,520 27	8,512 18	4,615 00	7,153 58
New York, southern district	1	1,000 00	16		19	2,656 94	46	195,420 92	712	51	17,851 62	216,929 48	7,592 43	43,003 94
New York, eastern district			2	679 53	2	366 17	7	1,000 00		9	733 03	2,778 73	255 00	225 00
North Carolina, eastern district	1	8,161 79	5	649 88						24	6,150 00	14,961 67	10,135 81	150 95
North Carolina, western district			2	3,400 00						63	15,650 00	19,050 00	3,110 00	
Ohio, northern district			3							3	1,849 41	1,849 41	1,823 07	935 86
Ohio, southern district	1	8,633 61	9	663 05			1			14	5,000 00	14,296 66	12,377 19	
Oregon										57			1,297 00	853 42
Pennsylvania, eastern district	7	27,809 50	12	26,991 65	2	255 71	5	700 00	52	37	44,206 58	99,963 44	34,355 00	483 54
Pennsylvania, western district	4	41,834 21	2							17	14,358 37	56,192 58	5,987 75	1,272 75
Rhode Island														
South Carolina			3							3			435 00	35 00
Tennessee, eastern district			1	78 26						15	12,300 00	12,378 26		
Tennessee, middle district										35	170,600 00	170,600 00	3,125 00	17 70
Tennessee, western district							1			19	5,175 00	5,175 00	950 00	11 76
Texas, northern district			3	314 70						11	3,900 00	4,214 70	1,278 56	26 10
Texas, eastern district			2				1			47	8,575 00	8,575 00	6,613 25	1,139 15
Texas, western district	1	14,170 20	1				41			48	11,950 00	26,120 20	5,094 30	629 70
Vermont			2				1		5	1	300 00	300 00	165 38	360 00
Virginia, eastern district			1	4,233 23			1			1		4,233 23	5 00	3,883 43
Virginia, western district			1							15	3,900 00	3,900 00	3,517 26	1,432 24
West Virginia	1	5,939 45	2							1		5,939 45	604 05	691 20
Wisconsin, eastern district	1	4,370 19					8	900 00		59	7,576 00	12,846 19	383 75	1,900 25
Wisconsin, western district	1	792 06								13	23,000 00	23,792 06	1,464 50	1,639 47
Arizona	2	5,757 26										5,757 26		
Dakota	1	1,572 50	6	12,147 53						35	2,160 00	15,880 03	17,483 07	10,041 56
Idaho										10	8,500 00	8,500 00		
Montana	1	42 10								3		42 10	142 10	56 29
New Mexico	1	108 48								1		108 48	570 00	137 73
Utah										1			250 00	
Washington	1	431 32								6		431 32	711 00	429 03
Wyoming	1	1,214 32	1	478 57								1,692 89	1,803 28	
District of Columbia	4	66,869 49			1	72 16				1	100 00	67,041 65		
Total	72	488,477 97	180	121,720 76	31	21,020 81	201	235,526 81	888	1,344	500,012 38	1,366,758 73	321,102 75	126,349 18

No. 7.—*Statistical summary of business arising from suits, &c., in which the United States is a party or has an interest, &c.*—Continued.

Judicial districts.	In suits brought during the fiscal year ending June 30, 1881.						In suits commenced prior thereto.									
	Decided for the United States.	Decided against the United States.	Settled, dismissed, &c.	Remitted.	Pending.	Total number of suits commenced.	Amount of judgments reported in all old suits this year.	Decided for the United States.	Decided against the United States.	Settled, dismissed, &c.	Remitted.	Amount reported collected in all old suits this year.	Total number of judgments rendered in favor of the United States this year.	Total number of suits disposed of.	Whole amount of judgments rendered in favor of the United States during the fiscal year ending June 30, 1881.	Whole amount of collections from all sources during the fiscal year ending June 30, 1881.
Alabama, northern district	8	.....	15	....	35	58	5,516 00	28	.....	36	....	423 25	36	87	6,558 00	533 00
Alabama, middle district	56	.....	37	....	7	100	616 75	5	.....	3	....	1,272 33	61	101	1,695 67	1,875 76
Alabama, southern district	26	.....	12	....	11	49	6,188 25	16	.....	1	....	3,784 67	42	55	15,982 33	4,186 37
Arkansas, eastern district	29	.....	5	1	7	42	.....	.....	.....	1	....	2,924 81	29	36	12,220 83	3,761 13
Arkansas, western district	124	.....	3	....	14	141	8,155 00	12	.....	4	....	159 53	136	143	22,215 50	1,089 83
California	20	.....	8	....	12	40	956 88	4	1	3	....	6,421 60	24	36	2,844 88	11,132 09
Colorado	10	.....	3	....	9	22	23,108 15	2	.....	2	....	5,242 41	12	17	24,257 29	6,434 18
Connecticut	5	.....	1	....	3	9	.....	.....	.....	4	....	1,553 56	5	10	603 00	1,805 43
Delaware	.....	.....	.....	....	.....	.....	10,195 10	2	.....	.....	....	691 93	2	2	10,195 10	691 93
Florida, northern district	.....	.....	.....	1	3	4	.....	.....	.....	.....	..	1,296 54	.....	1	.....	1,296 54
Florida, southern district	2	.....	1	....	.....	3	1,269 84	2	.....	1	...	935 92	4	6	1,312 69	997 95
Georgia	8	.....	21	....	47	76	5,254 30	10	.....	8	....	1,111 68	18	47	6,898 55	1,836 65
Illinois, northern district	33	.....	6	....	4	43	146 08	3	.....	1	....	71 72	36	43	7,958 39	1,652 13
Illinois, southern district	9	.....	.....	...	2	11	100 00	1	.....	.....	....	1,298 51	10	10	825 35	1,550 90
Indiana	11	.....	1	...	1	13	5 00	1	.....	1	....	124 92	12	14	401 82	368 74
Iowa	9	1	.....	....	3	13	419 00	3	.....	3	....	448 08	12	16	1,401 73	448 08
Kansas	14	.....	.....	....	5	19	3,722 82	11	.....	.....	....	1,600 37	25	25	4,496 01	1,644 27
Kentucky	4	.....	1	....	.....	5	1,017 48	2	1	4	...	9,945 49	6	12	1,039 48	10,078 13
Louisiana, eastern district	10	2	4	....	8	24	119,454 22	46	47	123	1	8,425 27	56	233	180,631 10	14,715 27
Louisiana, western district	.....	.....	.....	...	.....	.....	.....	.....	.....	.....	...	.....	.....	.....	.....	.....
Maine	6	.....	1	4	5	16	270 17	1	.....	.....	...	283 75	7	12	8,864 10	558 07
Maryland	8	1	.....	....	28	37	260 00	3	1	4	1	4,833 99	11	18	4,283 00	4,855 99
Massachusetts	29	.....	4	....	61	94	1,481 95	8	2	30	2	1,912 18	37	75	13,086 26	15,774 28
Michigan, eastern district	26	.....	.....	5	3	34	1,828 02	7	.....	2	....	10,584 71	33	40	13,230 02	15,793 63
Michigan, western district	12	.....	.....	....	6	18	200 00	1	.....	3	....	4,947 45	13	16	6,518 84	10,844 82
Minnesota	16	.....	1	....	2	19	25 00	1	.....	.....	....	236 88	17	18	2,106 00	3,620 22
Mississippi, northern district	44	.....	3	....	1	48	845 73	7	.....	.....	....	174 31	51	54	2,344 00	902 52

Mississippi, southern district	29				3	32	520 00	1		2		200 00	30	32	1,897 00	1,550 00
Missouri, eastern district	12		1	2	8	23	8,263 08	7				2,328 35	19	22	8,509 08	2,538 35
Missouri, western district	13				1	14	750 00	4		1			17	18	3,853 25	176 25
Nebraska	8				3	11	4,816 37	2		1		3,632 30	10	11	6,552 22	3,907 58
Nevada	2					2	8,501 00	9	1	3		800 56	11	15	32,712 70	800 56
New Hampshire					1	1										
New Jersey	11				3	14	165 11	1					12	12	3,516 11	85 95
New York, northern district	30		1		42	73	1,000 00	3	2			965 00	33	36	5,615 00	8,118 58
New York, southern district	47		67	12	719	845	20,698 93	45	17	808	3	73,527 98	92	999	28,291 36	116,531 92
New York, eastern district	9		1		10	20	1,840 73	6		6		500 00	15	22	2,095 73	725 00
North Carolina, eastern district	4	2	14		10	30	1,686 14	9	1	5		728 01	13	35	11,821 95	878 96
North Carolina, western district	16		34		15	65	37,914 53	81	1	50		100 85	97	182	41,024 53	100 85
Ohio, northern district	5				1	6	142 78	2				8,182 12	7	7	1,965 85	9,117 98
Ohio, southern district	23				2	25	484 94	3	4	1		589 21	26	31	12,862 13	589 21
Oregon	57					57		1	2	1	1	2,853 44	58	62	1,297 00	3,706 86
Pennsylvania, eastern district	35		3		77	115	66,368 09	38	6	5		9,092 43	73	87	100,723 09	9,575 97
Pennsylvania, western district	15				8	23	2,482 24	5	1	1		1,469 66	20	22	8,469 99	2,742 41
Rhode Island																
South Carolina	6					6			1			162 05	6	7	435 00	197 05
Tennessee, eastern district			10		6	16	7,521 91	10		12		50 00	10	32	7,521 91	50 00
Tennessee, middle district	8		4		23	35	20,649 50	42		26		550,581 21	50	80	23,774 50	550,598 91
Tennessee, western district	7		11		2	20	1,139 97	2		2		1,112 73	9	22	2,089 97	1,124 49
Texas, northern district	7		2		5	14	3,933 94	9		3		1,383 19	16	21	5,212 50	1,409 29
Texas, eastern district	41		6		3	50	22,905 08	48		11		1,504 82	89	106	29,518 33	2,643 97
Texas, western district	53	1	1		36	91	9,989 81	18		9		5,199 85	71	82	15,084 11	5,829 55
Vermont	3		1		5	9		1		2		3,770 06	4	7	165 38	4,130 06
Virginia, eastern district	1		1		1	3				14			1	16	5 00	3,883 43
Virginia, western district	12				4	16	2,300 00	9		6		15 45	21	27	5,817 26	1,447 69
West Virginia	3				1	4	5,673 95	13		76		1,148 80	16	92	6,278 00	1,840 00
Wisconsin, eastern district	22		36	3	7	68	1,642 03	1	1	1		2,514 93	23	64	2,025 78	4,415 18
Wisconsin, western district	9				5	14	3,785 41	10		2		2,845 87	19	21	5,249 91	4,485 34
Arizona					2	2			1					1		
Dakota	31		2		9	42	1,000 00	2				452 47	33	35	18,483 07	10,494 03
Idaho			1		9	10				1		300 00		2		300 00
Montana	2				2	4	250 00	1					3	3	392 10	56 29
New Mexico	1		1			2	1,000 00	2	1				3	5	1,570 00	137 73
Utah	1					1							1	1	250 00	
Washington	6				1	7	850 00	6				1,058 20	12	12	1,561 00	1,487 23
Wyoming	2					2	257 80	1				263 61	3	3	2,061 08	263 61
District of Columbia					6	6						1,176 29				1,176 29
Total	1,050	7	324	28	1,307	2,716	429,569 08	568	91	1,283	8	749,215 30	1,618	3,359	750,671 83	875,564 48

No. 8.—*Statement showing the number of suits in which the United States was a party or had an interest, commenced in each year from the establishment of the office of the Solicitor of the Treasury to June 30, 1881; also, the aggregate amounts claimed in said suits, and the number decided or otherwise disposed of; together with the aggregate sums collected in each of said years.*

Years.	Number of suits commenced.	Amount claimed.	Amount collected.	Number of suits decided for the United States.	Number of suits decided against the United States.	Number of suits settled and otherwise disposed of.
1830	403			215	11	56
1831	465			253	28	43
1832	615			370	51	36
1833	457			276	13	62
1834	447			225	7	85
1835	282			214	7	28
1836	430			182	18	27
1837	4,570			550	11	61
1838	1,089			586	12	44
1839	1,319	$25,494,359 00	$6,210,720 93	561	75	171
1840	804			524	50	105
1841	418			237	62	135
1842	614			313	35	106
1843	387			186	53	68
1844	421			137	40	149
1845	447			126	85	106
1846	364			83	19	78
1847	250			119	9	57
1848	155			64	34	122
1849	102	277,310 26	4,766 24	11	1	23
1850	91	229,583 59	29,987 30	17	15	19
1851	352	131,379 87	48,002 52	12	13	89
1852	437	290,281 18	14,345 97	7	1	5
1853	84	211,193 16	28,112 41	4	3	2
1854	586	667,560 56	351,235 59	142	145	48
1855	918	705,745 68	436,722 17	298	92	386
1856	747	1,271,040 35	517,404 64	207	99	272
1857	520	1,130,979 78	748,532 07	200	89	337
1858	726	2,054,092 11	398,064 09	199	69	158
1859	744	916,492 84	1,246,805 71	271	54	211
1860	760	751,704 86	434,201 32	213	101	163
1861	529	44,279 16	343,346 46	178	28	118
1862	1,072	1,463,229 55	461,438 87	384	105	203
1863	2,051	1,066,939 05	*a*2,997,709 45	694	258	454
1864	2,604	856,644 34	*b*7,985,532 91	1,004	26	156
1865	2,348	2,199,527 35	*c*9,558,621 42	912	18	127
1866	4,672	*e*8,066,629 65	*d*4,577,363 76	1,807	59	1,435
1867	3,873	*f*13,582,619 22	2,620,696 69	2,193	265	702
1868	2,004	10,970,147 59	644,517 42	547	88	450
1869	2,169	10,087,346 98	719,795 24	533	76	722
1870	1,868	5,367,007 44	477,025 37	511	94	715
1871	2,116	12,604,601 01	1,289,920 06	1,059	207	1,538
1872	1,854	8,567,185 11	1,000,422 41	948	100	1,128
1873	2,715	7,758,168 59	778,252 17	632	27	748
1874	2,986	10,117,653 50	1,113,112 39	580	18	628
1875	2,734	10,169,212 91	621,950 18	653	12	542
1876	2,339	7,001,358 77	868,198 41	651	25	298
1877	1,874	*g*14,073,031 17	2,052,973 58	1,030	156	1,244
1878	2,326	2,340,811 35	364,537 44	1,173	43	1,384
1879	2,060	3,755,831 39	608,632 02	1,125	94	2,870
1880	2,399	1,566,307 86	448,871 41	1,255	160	2,731
1881	2,716	1,366,758 73	875,564 48	1,618	98	1,646
Total	69,315	167,548,013 96	50,877,383 20	26,289	3,259	22,991

a $2,665,276.01 of this collection were in prize and confiscation cases.
b $7,700,412.60 of this collection were in prize and confiscation cases.
c $9,055,867.41 of this collection were in prize and confiscation cases.
d $2,440,860.12 of this collection were in prize and confiscation cases.
e $1,416,232.42 of this amount were in internal-revenue cases, since 1867 under control, by law, of the Commissioner of Internal Revenue.
f $4,513,806.44 of this amount were in internal-revenue cases, since 1867 under control, by law, of the Commissioner of Internal Revenue.
g $10,876,600 of this amount involved in six suits against the Kansas Pacific Railroad Company to recover moneys illegally obtained from the United States.

EXHIBIT R.—*Report of the president of the board of trustees of the Reform School of the District of Columbia.*

REFORM SCHOOL OF THE DISTRICT OF COLUMBIA,
Washington, October 24, 1881.

SIR: Pursuant to the requirements of the act of May 18, 1876, establishing the Reform School for the District of Columbia, I have the honor herewith to submit the twelfth annual report of the school for the fiscal year ending June 30, 1881. Upon the termination of the preceding fiscal year there were remaining in the school 159 boys. Sixty were committed during the year, making the total in the school during said fiscal year 219. Sixty-seven were discharged by the board of trustees, having gained such discharge by reason of good conduct at school, and 14 were absent without leave. At the close of the year 138 boys remained in the school. Of those sent to the school 17 were committed by the president of the board, 8 by the supreme court of the District of Columbia, and 35 by the police court of the District of Columbia. As to further information relative to the general condition of the boys, reference is made to the report of the superintendent, herewith.

It is with special satisfaction that the board points to the health of the school, not only during the past year, but since its organization. No sickness of any moment, except such slight physical disorders as readily yielded to medical treatment, has prevailed during the last year; no death or accident of any kind has occurred; and, although the school has been in operation fifteen years and over, 700 boys have been received and cared for, yet out of this number but 5 deaths have occured, 2 by accidents and 3 by disease.

The farm and garden have produced very well, and during the past summer the boys were abundantly supplied with fresh vegetables and fruits. But little of the vegetables and fruits are sold, as it has been learned by experience that in a sanitary as well as economical point of view it is better to give the boys such products as are raised at the school than to dispose of the same in market. The few dollars that might be realized from such sales would not compensate for depriving the inmates of the same, which they cultivate and have a right to enjoy.

During the year many repairs and improvements have been made, much grading around the buildings has been completed, and the additional land, purchased out of money received from the trustees of the estate of Jay Cook & Co., put under cultivation. When this land is properly fenced and fertilized it will be a great acquisition to the school and a long-felt want be supplied. An apple orchard has been set out upon this land, and it is the intention of the board to add largely to it this season. The soil of the entire farm is thin and requires much fertilizing to cause it to produce, and it is thought by the trustees to be desirable to put as much of it in fruit as possible. The cultivation and care of fruit trees not only give the boys out-door labor, but teach them an occupation which will inure to their advantage in after life, especially those who may "follow the plow" for a livelihood.

Congress having authorized the trustees to use the balance of the money in the hands of their treasurer, received from the estate of Jay Cooke & Co. for the erection of buildings, repairs, and improvements, proposals for the construction of a workshop have been advertised for, and a contract entered into for the immediate prosecution of the work, and it is hoped that before many months shall have elapsed, the building will have been erect d, the necessary machinery supplied, and the boys

put to useful occupations and trades, whereby the revenue of the school may be increased and the inmates taught trades that they may carry with them into the world, and earn thereby an honest and competent support. The need of workshops for the purpose of teaching the boys suitable trades has long been felt, and now that, through the liberality of Congress, the means have been provided,each and every boy, according to his ability, will be taught something that will serve him in the future that awaits him.

One of the greatest drawbacks we have had to contend with has been the want of an adequate supply of water. This, however, has been happily overcome. An abundance of good pure water has been found by sinking wells upon the farm. A pump-house has been erected and machinery of sufficient power purchased for the purpose of forcing water to all portions of the buildings and grounds. This work is now about completed, and it is thought that a sufficient supply of pure water has been obtained, not only for present wants, but for future demands in this direction. Heretofore, especially in times of drought, the want of water has been seriously felt, but now there is an abundance of water to spare.

Estimates of the necessary appropriations for the next fiscal year have been submitted to the Commissioners of the District of Columbia, by whom they have been, as required by law, referred to the Secretary of the Treasury. The usual amounts for salaries and subsistence, amounting to $31,674, have been asked. In addition thereto the sum of $5,000 for heating apparatus, $1,000 for the purchase of stock, and $1,000 for fencing have also been asked. The heating apparatus requires a general overhauling, and two new boilers are absolutely necessary. The present means of heating the buildings are inadequate, and, besides, the apparatus and boilers are nearly worn out, and it will be with great difficulty that they may be made to heat the building for the coming winter. It is therefore earnestly hoped that Congress will provide the means for making such repairs and additions as are required. The farm is almost without any fencing, and now that 150 acres additional have been purchased much fencing is required, also more stock is needed—both horses and cattle—and the $2,000 asked for these purposes is very moderate, and it is hoped the same may be granted.

During the fiscal year the receipts of the school were as follows:

From the District of Columbia, on account of support of boys	$15,386 23
By requisition upon the Treasury Department	15,600 00
From sundry receipts of school	1,009 67
From the estate of Jay Cooke & Co., as per act of Congress, approved June 30, 1880	8,500 00
Total	40,495 90

As to the manner of disposing of these funds, your attention is respectfully invited to the report of the treasurer of the school submitted herewith.

I desire again to invite attention to the necessity for more room in the school for erring and wayward boys. The school now contains as many inmates as it can comfortably provide for, and yet there are many boys on the streets of the city, leading vicious and vagrant lives, who should be cared for. These boys will soon be men, and unless their steps be diverted in the proper direction their march will be onward to the jail, penitentiary, or worse. It is the duty of the authorities to do something in this particular. Especially during the inclement seasons of the year are these boys to be seen upon our streets begging and eking out a precarious living in such manner as they can. It is a Christian

obligation to provide for them and give them a comfortable home, education, and the means of fitting them for a life of usefulness hereafter. A large majority of these boys could be reclaimed and made good and useful citizens, a credit to themselves and their country; but, if let alone in their present condition, for the want of proper care and a helping hand, their career must be downward. A few thousand dollars spent in enlarging the capacity of our school will save many of these youths, not only in this life but in the one to come. It is the paramount wish of the board of trustees to impress upon Congress the necessity of doing something at the coming session for this class of boys. An additional building capable of accommodating a class of fifty boys could be erected for the sum of $8,000, and it could be filled with inmates by the time it was completed. As has often been said, it is cheaper to prevent crime than to punish it, and, if the matter is only considered as a question of dollars and cents, it is manifestly more economical to the Government and District of Columbia to feed, clothe, and educate these boys than it may be hereafter to try, convict, and subsist them in the jails and penitentiaries of the country. A large proportion of the boys who leave the school turn out well, many of whom are now honorably supporting themselves and assisting their parents, and promise to become valuable members of society, who, without the influence and training received at the school, might have been a burden upon the community on which they were cast. In my visits to the jail, upon more than one occasion my heart has been pained at the sight of many boys of tender age confined therein as the associates of criminals of the worst character. Such associations and schooling, although perhaps of brief duration, hardens them and turns their thoughts upon the dark side of life, making them realize they are outcasts, with none to care for them, and they soon become adepts in crime. They go from jail ripe for misdemeanors and are soon returned to their old quarters. Upon one occasion I saw no less than fourteen boys under the tender age of sixteen years in the jail of this District, confined for petty offenses, all of whom should have been sent to the Reform School, and who would have been sent there had there been accommodations for them. It is sincerely hoped that Congress may do something to prevent in the future a recurrence of this evil.

It is with pleasure that the trustees refer to the conduct of the boys generally. They have performed their tasks with cheerfulness, studied their lessons faithfully, and have behaved themselves as well as school boys usually do. The trustees have, as far as practicable, granted them such privileges as good conduct entitled them to. They have allowed the inmates to attend the National Fair held in this city, and it was intended to have given them another excursion down the Potomac, but owing to the sad calamity which befell the President of the United States it was deemed improper to indulge in merry-making when the head of our country was lingering and dying from injuries received at the hands of an assassin.

Attention is invited to the report of Doctor Wells, the physician to the school. The doctor has labored faithfully and most successfully during the time he has been connected with the institution, and for his intelligent consideration of and attention to the wants of the boys, he is entitled to the thanks and confidence of the Board of Trustees.

The superintendent, officers, and employés have performed their duties faithfully, attentively, and for the present good discipline and management they are entitled to due credit.

The board of trustees appointed a committee of its members for the

purpose of visiting and inspecting schools of a character similar to ours in other portions of the country. The committee performed this service and made a report to the board. It visited the following reformatories, viz: House of the Good Shepherd and House of Refuge at Baltimore, Md.; House of Refuge, Philadelphia, Pa.; New York House of Refuge at Randall's Island, and the New York Catholic Protectory at West Chester, N. Y.; House of Reformation, Deer Island, Boston Harbor; Marsella Street Home, Boston, and Massachusetts State Reform School at Westborough, Mass., in all of which they were received courteously and every facility offered for a thorough examination, particularly bearing upon the industries of those institutions. The members of the committee saw much to please and gratify them, and which will enable the board to bring our institution up to a higher standard, and I submit herewith extracts from their report to the board.

Especial attention is invited to the recommendations made by the committee for the enlargement and improvement of our own school, and it is trusted that Congress will take such action as will enable the board to carry out the views of the committee in this respect.

Very respectfully,

A. J. FALLS.

The Hon. the ATTORNEY-GENERAL.

Report of the superintendent of the Reform School of the District of Columbia.

REFORM SCHOOL OF THE DISTRICT OF COLUMBIA,
October 5, 1881.

GENTLEMEN: I have the honor to report to you in brief the operations of the school during the fiscal year ending June 30, 1881, making the twelfth year of the existence of the school.

During the year just closed the inmates have been remarkably free from epidemic diseases; not one accident or death has occurred among them. Dr. Wells, physician to the school, has been unremitting in his attention to the wants of those requiring his care.

The educational department of the institution has been continued as in former years. The progress made by the boys in their studies has been very satisfactory. During the warm weather the schools were closed, and more time given the boys for play.

The ages of those received were as follows: Seven years, 1; nine years, 2; ten years, 3; eleven years, 2; twelve years, 12; thirteen years, 8; fourteen years, 15; fifteen years, 10; sixteen years, 3; seventeen years, 2; eighteen years, 2.

Birth-places of those admitted, as follows: District of Columbia, 43; Virginia, 7; Maryland, 6; New York, 1; Texas, 1; Pennsylvania, 1; and Kentucky, 1.

Percentage of those admitted: American, 10; colored, 37; German, 2; English, 1; Irish, 8; French, 1; Scotch, 1.

Commitments were for offenses, as follows: Incorrigibility, 24; vagrancy, 9; larcency, 21; grand larceny, 1; petit larceny, 1; robbery, 1; murder, 1; forgery, 1; disorderly assembly, 1.

Of those admitted 7 had neither father nor mother; 11 had lost father; 12 had lost mother, and 30 had both parents living.

Commitments of each month during the year were as follows: July

3; August, 8; September, 4; October, 12; November, 3; December, 5; January, 5; March, 4; April, 4; May, 6; June, 6.

The returns from the farm and garden have been very satisfactory. The school has been furnished with an abundant supply of vegetables. The gardener reports the following to have been gathered from the farm and garden during the past fiscal year: 8 tons hay, 10 tons oats in straw, 8 tons rye straw, 40 tons corn fodder, 180 bushels rye, 5,428 heads cabbage, 1,100 dozen green corn, 355 bushels sweet-potatoes, 200 bushels Irish potatoes, 35 dozen celery, 351 dozen radishes, 388 dozen cucumbers, 56 bushels beans, 22 bushels Lima beans, 69 bushels onions, 214 dozen carrots, 26 bushels parsnips, 146 bushels beets, 669 egg-plants, 800 bushels turnips, 12 barrels squashes, 63 bushels green pease, 507 watermellons, 1,458 cantaloups, 94 bushels lettuce, 1 bushel parsley, 38 bundles asparagus, 1,458 pumpkins, 26 barrels rhubarb, 425 cucumbers, 275 bushels tomatoes, 764 bushels field corn, 30 bushels kale, 24 barrels spinach, 426 quarts strawberries, 53 bushels apples, 10½ bushels peaches, 41½ bushels grapes, 150 quarts blackberries, 5 quarts currents, 5 barrels cider vinegar, 5,834 pounds pork.

During the year the superintendent has received, and turned the same over to the treasurer of your board, as will appear by his report, the sum of $1,009.67.

The chapel services at three o'clock Sabbath afternoons have been very interesting, as well as instructive.

On Sabbath morning we have a Sabbath school in which the international lesson leaves are used, with good singing and perfect recitations by the boys. The explanations given by the teachers make the exercises of the Sabbath school very interesting.

At the close of the previous year there were remaining in the school 159 boys; committed during the year, 60; making 219 the number cared for. Of this number, 67 were discharged and 14 absent without leave, leaving 138 in the school at the close of the year.

Those received were committed by the following authorities: President of the board of trustees, 17; supreme ccurt of the District of Columbia, 8; police court of the District of Columbia, 35.

The result of our labor in the shops has been as satisfactory as we could expect. We have been unable to secure a sufficient amount of chair-work to keep the classes employed regularly during the past year.

The tailor-shop, with an average number of eight boys, has made and repaired all the clothes worn by the boys. It has made 561 shirts, 475 pairs of pants, 177 coats, 250 pairs of suspenders, 54 pairs of drawers, 14 aprons, 54 clothes-sacks, 47 pillow-ticks, 34 bed-ticks. Also, repaired 3,245 shirts, 7,578 pairs of pants, 1,741 coats, 1,861 pairs of drawers, 27 bed-ticks, 17 clothes-sacks. 57 grain-bags, 4 carpets, 6,500 pairs socks.

The seamstress has made 180 sheets, 200 pairs pillow-slips, 16 bolster-slips, 20 pairs pillow-ticks, 40 bed-ticks, 36 spreads, 2 comforts, 6 feather pillows, 25 table-cloths, 48 napkins, 82 towels, 60 collars, 100 aprons, 60 pairs mittens, and 100 fine shirts; and repaired 210 sheets, 51 pillow-slips, 5 bolster-slips, 25 pillow-ticks, 141 bed-ticks, 82 spreads, 60 table-cloths, 226 towels, 90 aprons, and 48 jackets.

The shoe-shop, with an average number of six boys, has made and repaired all the shoes worn by the boys for every-day wear. It has made 246 pairs of new shoes and repaired 684 pairs of shoes.

The work upon the roadways, walks, and lawns has been continued during the past year, when the weather would permit, and the improvements made have added much to the appearance of the grounds.

We have also planted 735 apple trees, which are in a very prosperous

condition. With proper care, in a few years they will prove of great value to the school.

We received, through the kindness of Mr. Thomas Evans, of Washington, D. C., 20 volumes of valuable books for the use of the boys. Also a large amount of papers and magazines from the Post-Office Department.

Respectfully submitted.

S. C. MULLIN,
Superintendent.

Report of the treasurer of the Reform School of the Distrct of Columbia.

REFORM SCHOOL OF THE DISTRICT OF COLUMBIA,
Washington, October 1, 1881.

SIR: I have the honor to hand you herewith a detailed statement of my receipts and disbursements, as treasurer, during the fiscal year ended June 30 last.

Very respectfully,

SAM'L W. CURRIDEN,
Treasurer.

A. J. FALLS, Esq.,
President Board of Trustees.

STATEMENT.

RECEIPTS.

From appropriation of $31,000.00.	
District of Columbia, on account of support of boys therefrom	$15,386 23
Requisition United States Treasury Department	15,600 00
Sundry receipts of school	1,009 67
From estate of Jay Cooke & Co., bankrupts, as per act approved June 30, 1880	8,500 00
	40,495 90

DISBURSEMENTS.

1880.	Wm. H. Hoover, meat	$191 87
July	William M. Galt & Co., flour	229 75
	Browning & Middleton, groceries	59 21
	J. B. Bryan & Bro., groceries	60 23
	Hume, Cleary & Co., groceries	165 60
	Barbour & Hamilton, groceries	53 48
	George King, leather, &c	21 15
	Stott & Cromwell, drugs	5 40
	George Watts, kitchenware	20 60
	Lewis Baar, agent, oil	2 40
	George N. Holland, hardware, &c	12 05
	George Ryneal, jr., glass	3 00
	Basshor & Stebbins, pipe, &c	3 99
	Lansburg & Bro., dry goods	49 12
	McKelden & Co., pipe	14 03
	Carl Mueller, sundries	40 95
	Washington Gas-Light Company, gas, July	18 00
	T. J. Edwards, plumbing	41 83
	S. C. Mullin, superintendent, pay-roll, July	789 33
	S. C. Mullin, superintendent, sundries	7 53
	J. N. O'Meara, sundries	7 17
	Lewis Coomes, wages	8 00
	R. Joseph, trustee, expenses to Philadelphia and return	17 55
Aug.	Augustus Davis, jr., brick-work, &c	137 17
	S. W. Curriden, treasurer, expenses to Philadelphia and return	15 40
	J. B. Olcott & Son, hack hire	21 00
	Peter Crowe, wages, July	30 00

1880.		
Aug.	John A. Baker, tools	$40 15
	T. C. Basshor & Co., pump fixtures	12 50
	S. C. Mullin, superintendent, pay-roll, August	786 33
	Peter Crowe, wages, August	30 00
Sept.	J. B. Olcott & Son, hack hire	21 00
	Washington Gas-Light Company, gas, August	26 00
	William H. Hoover, meat	149 51
	J. B. Bryan, groceries	55 06
	Browning & Middleton, groceries	104 49
	L. W. Guinand, coal	58 00
	Barbour & Hamilton, groceries	93 60
	George Watts, table ware	3 70
	Lansburg & Bro., dry goods	33 36
	George Ryneal, jr., oil, &c	4 05
	William R. Riley, dry goods	112 78
	William R. Riley, dry goods	11 75
	Lewis Baar, agent, buttons, &c	2 37
	William Ballantyne & Son, stationery	15 48
	C. W. Thorn & Co., dry goods	26 05
	Hume, Cleary & Co., groceries	94 98
	John A. Baker, seed, &c	8 88
	A. J. Joyce, washer, &c	1 75
	George King, leather	33 63
	Stott & Cromwell, medicines	8 87
	William M. Galt & Co., flour	240 66
	George N. Holland, guano, &c	17 55
	C. A. Wells, medical services	50 00
	Henry Franc. hats	15 60
	Campbell & Kennedy, hardware	29 59
	George C. Maynard, rent of telephone	15 00
	Freeman W. Howe, balance Peters' farm	8,500 00
	Basshor & Stebbins, new boiler, &c., pump-house	267 91
	T. C. Basshor & Co., completing laundry	211 43
	C. H. Greeley, acting superintendent, pay-roll superintendent	789 33
	Peter Crowe, wages, September	30 00
	C. H. Greeley, acting superintendent, sundries	31 80
	C. A. Wells, medical services	36 00
Oct.	William H. Hoover, meat	132 58
	Hume, Cleary & Co., groceries	242 93
	George King, leather	41 31
	William M. Galt & Co., flour, &c	243 34
	William R. Riley, dry goods	125 00
	John A. Baker, plow, &c	14 80
	Campbell & Kennedy, wire	6 25
	Barbour & Hamilton, sugar	32 40
	George N. Holland, soap, &c	6 37
	Browning & Middleton, groceries	10 50
	William Ballantyne & Son., school books, &c.	7 90
	K. Kneessi, brushes, &c	3 00
	L. Baar, agent, repairing sewing-machines	4 75
	McKelden & Co., brassware	2 99
	George Watts, tableware	15 07
	Stott & Cromwell, medicines	18 90
	Lansburg & Bro., dry goods	18 75
	William B. Peddrick, secretary, services	25 00
	S. W. Curriden, treasurer, services	125 00
	F. W. Howe, rent of land	104 16
	J. B. Olcott & Son, hack hire	12 00
	Washington Gas-Light Company, gas, September	32 00
	Keyes & Co., hack hire	6 00
	C. A. Denekas, yeast	10 52
	S. C. Mullin, superintendent, sundries	25 68
	Notley Anderson, laundry fixtures	125 05
	S. C. Mullin, superintendent, pay-roll, October	801 83
	B. D. Carpenter, surveying land	208 00
	Gibson Bros., printing	16 50
Nov.	Hume, Cleary, & Co, groceries	219 96
	Stott & Cromwell, medicines	4 20
	George King, leather	29 70
	Wm. H. Hoover, meat	148 70

1880.		
Nov.	S. C. Mullin, superintendent, sundries	$19 81
	Peter Crowe, wages, October	30 00
	Wm. Ballantyne & Son, school-books	15 13
	J. H. Johnson, agent, fruit-trees	185 00
	Geo. Watts, tableware	9 75
	W. B. Williams, enamel cloth	18 20
	Wm. R. Riley, dry goods	90 16
	L. Baar, agent, needles	1 25
	H. Adler, agent, dry goods	11 75
	C. W. Thorn & Co., caps	118 90
	John A. Baker, seed, &c	13 10
	R. Cohen, shoestrings	4 50
	Gill & Reardon, glass	81 00
	Lansburg & Bro., dry goods	25 87
	K. Kneessi, horse-blanket	5 00
	Barbour & Hamilton, groceries	56 64
	Geo. Ryneal, jr., paint, &c	6 95
	J. B. Olcott & Son, hack hire	12 00
	National Republican, advertising coal	7 00
	R. Cohen, shoes	196 10
	Washington Gas-Light Company, gas, October	52 00
	Daniel Haunan, repairing building	50 75
	W. W. McCullough, lumber	139 59
Dec.	S. C. Mullin, superintendent, pay-roll, November	790 83
	L. W. Guinand estate, coal	35 70
	Andrew Barbour, mason work	8 00
	Wm. M. Galt & Co., flour	218 35
	Wm. W. Brereton, carpeting	30 00
	David Mahoning, plastering	47 50
	Peter Crowe, wages	15 00
	John H. Smith, wages	5 00
	R. Cohen, shoes	14 65
	N. Anderson, work on laundry	110 27
	G. N. Holland, tools	53 43
	Keyes & Co., hack hire	3 00
	W. B. Williams, tables	4 00
	Sinclair & Ashenback, repairing steam-pump	24 85
	George Watts, tableware	23 00
	Wm. M. Galt & Co., flour	198 50
	Wm. H. Hoover, meat	149 65
	Geo. Ryneal, jr., paint	10 30
	Wm. Ballantyne & Son, stationery	4 15
	H. Adler, agent, dry goods	33 07
	C. N. Thorn & Co., dry goods	11 50
	Wm. R. Riley, dry goods	45 37
	Campbell & Kennedy, hardware	62 28
	George King, leather	32 23
	C. A. Wells, M. D., services	30 00
	Gill & Reardon, putty	6 03
	J. B. Bryan & Bro., groceries	9 50
	Lansburg & Bro., dry goods	102 30
	W. W. McCulloch, lumber	30 00
	Barbour & Hamilton, groceries	55 84
	Browning & Middleton, groceries	36 07
	Hume, Cleary & Co., groceries	361 52
	S. C. Mullin, superintendent, sundries	30 52
	J. B. Olcott & Son, hack hire	6 00
	Evening Star Newspaper Company, advertising	4 00
	Washington Gas-Light Company, gas, November	60 00
	S. C. Mullin, superintendent, sundries	27 99
	S. C. Mullin, superintendent, December pay-roll	838 33
	David Mahoney, plastering	15 00
	Wm. W. Brereton, wages, carpentering	32 50
	S. W. Curriden, services	125 00
	Wm. B. Peddrick, services	25 00
	Wm. H. Hoover, meat	115 41
1881.		
Jan.	Wm. M. Galt & Co., flour	152 25
	Browning & Middleton, groceries	5 75

1881.		
Jan.	Geo. Breitbarth, agent, furniture	$11 75
	J. Lansburgh, dry goods	17 56
	Geo. Watts, kitchenware	7 67
	Wm. Ballantyne & Son, books	8 48
	Lansburg & Bro., dry goods	94 07
	K. Kneessi, lap robe	5 25
	W. D. Wyvill, stoneware	23 40
	Paul Heyser, flower pots	18 00
	Gill & Reardon, glass	23 16
	Hume, Cleary & Co., groceries	247 70
	George King, leather, &c	50 43
	Robert Cohen, shoes	4 50
	A. J. Joyce, carriage repairs	18 50
	N. Anderson, carpenter work	19 50
	Campbell & Kennedy, hardware	22 80
	H. Adler, agent, dry goods	4 80
	Geo. Ryneal, jr., paint	6 40
	Wm. R. Riley, dry goods	30 94
	Stott & Cromwell, medicine	4 40
	Gray & Noyes, repairs to steam-boiler	73 05
	Daniel Hannan, plumbing	194 50
	C. A. Denekas, yeast	10 42
Feb.	S. C. Mullin, superintendent, pay-roll, January	826 33
	S. C. Mullin, superintendent, sundries, January	32 10
	Anna C. Day, wages, January	12 00
	Samuel Morse, wages, December and January	16 00
	Wm. McDevitt, wages, December and January	14 00
	Wm. M. Galt & Co., flour	240 20
	Hume, Cleary & Co., groceries	244 93
	Geo. King, leather	28 98
	Lansburgh & Bro., dry goods	59 49
	Baker, Smith & Co., castings	25 35
	Browning & Middleton, groceries	37 00
	Wm. R. Riley, dry goods	21 00
	Wm. H. Hoover, meat	181 10
	Campbell & Kennedy, hardware	3 53
	Stott & Cromwell, drugs	8 92
	Geo. N. Holland, brooms, &c	6 75
	Thos. Geary, hack hire	3 00
	K. Kneessi, horse blanket	5 00
	H. Hollander, chamber ware	2 60
	Geo. Ryneal, jr., paint	4 00
	McKelden & Co., pipe	1 51
	Wm. Ballantyne & Son, books	7 55
	Lewis Baar, agent, oil, &c	3 90
	Wm. H. Boyd, city directory	5 00
	Washington Gas-Light Company, gas, December	74 00
	Washington Gas-Light Company, gas, January	56 00
	Chas. A. Wells, medical services	50 00
	Dan'l Hannan, plumbing	192 65
	S. C. Mullin, superintendent, pay-roll, February	838 33
March.	Hume, Cleary & Co., groceries	229 32
	Wm. R. Riley, dry goods	62 35
	Geo. King, leather	34 74
	Browning & Middleton, groceries	32 03
	Geo. Ryneal, jr., paint	7 25
	Wm. M. Galt & Co., flour, &c	208 53
	Columbia Railway Company, manure	215 60
	Lansburgh & Bro., cloth	25 38
	Stott & Cromwell, drugs	17 30
	Wm. Ballantyne & Sons, school-books	8 40
	Barbour & Hamilton, groceries	19 08
	Wm. H. Hoover, meat	150 28
	J. B. Olcott & Son, hack hire	15 00
	McKelden & Co., plumbing material	6 57
	H. Adler, agent, dry goods	10 40
	John A. Baker, seed	4 50
	H. Hollander, table ware	12 43
	K. Kneessi, harness	2 50
	Geo. Watts, table ware	5 40

1881.		
March.	C. A. Wells, medical services	$38 00
	S. C. Mullin, superintendent, sundries	34 07
	W. McDevitt, wages, February	7 00
	Sam'l Morse, wages, February	8 00
	Johnson Bros., coal bill	2,168 51
	S. C. Mullin, superintendent, pay-roll, March	823 33
	Washington Gas-Light Company, gas, February	44 00
	S. W. Curriden, services	125 00
	W. B. Peddrick, services	25 00
April.	S. C. Mullin, superintendent, sundries	16 77
	Chas. A. Wells, medical services	16 00
	Geo. Breitbarth, furniture	28 50
	Browning & Middleton, groceries	146 69
	John A. Baker, seed	64 35
	McKelden & Co., plumbers' supplies	4 10
	Geo. King, leather	29 67
	Wm. Ballantyne & Son, stationery	8 85
	Wm. R. Riley, dry goods	131 46
	Stott & Cromwell, drugs	3 00
	Wm. H. Hoover, meat	171 30
	R. Cohen, shoe-strings	1 40
	Campbell & Kennedy, hardware	13 34
	H. Adler, agt., dry goods	34 28
	Lansburg & Bro., dry goods	22 01
	Wm. M. Galt & Co., flour, &c	329 57
	Danl. Hannan, plumbing	19 80
	G. N. Holland, woodenware	26 59
	Potomac Terra Cotta Company, pipe	41 86
	J. B. Slack, services	15 00
	Hume, Cleary & Co., groceries	89 89
	W. D. Wyvill, hardware	99 14
	Saml. Morse, services	8 00
	Wm. McDevitt, services	7 00
	David Smith, making vase	10 00
	Frank Williams, making vase	10 00
	S. C. Mullin, superintendent, pay-roll, April	795 33
	Washington Gas-Light Company, gas, March	50 00
	C. A. Denekas, yeast	9 98
	A. J. Joyce, repairs to carriage	28 50
	S. C. Mullin, superintendent, sundries	21 03
	Carrie V. Croffutt, wages to April 30	7 20
	John H. Smith, wages to April 30	6 00
May.	John O'Conner, wages, April	10 00
	Saml. Morse, wages, April	8 00
	Wm. McDevitt, wages, April	7 00
	C. O. Lewis, medical services	8 00
	T. W. Murphy, veterinary services	10 00
	Wm. M. Galt & Co., flour and feed	315 99
	Browning & Middleton, groceries	148 18
	Hume, Cleary & Co., groceries	158 36
	Geo. Watts, tableware	3 65
	Barbour & Hamilton, groceries	94 06
	Stott & Cromwell, drugs	15 00
	Geo. King, leather	23 20
	Lansburg & Bro., dry goods	20 07
	Wm. R. Riley, dry goods	111 11
	John A. Baker, seed and tools	82 15
	Wm. H. Hoover, meat	202 10
	Johnson Bros., coal	167 50
	L. Baar, agent, needles, &c	2 80
	H. Adler, agent, buttons	2 40
	Wm. Ballantyne & Son, testaments	8 64
	McKelden & Co., pipe	2 45
	R. Cohen, shoe laces	9 00
	Geo. Ryneal, jr., paint	11 75
	Campbell & Kennedy, hardware	2 85
	Gibson Bros., printing	59 50
	Geo. N. Holland, guano	44 35
	J. D. Free, jr., papers	44 00

1881.		
May.	J. B. Olcott & Son, hack hire	$12 00
June.	S. C. Mullin, superintendent, pay-roll, May	851 66
	S. C. Mullin, superintendent, sundries	37 27
	Geo. W. Conner, wages	10 00
	Edwd. Derby, carpentering	34 87
	Andrew J. Joyce, carriage repairs	19 75
	Chas. A. Wells, medical services	60 00
	J. N. O'Meara, hardware	13 80
	W. D. Wyvill, repairing tinware	6 00
	Campbell & Kennedy, hardware	6 55
	Geo. Breitbarth, furniture	13 10
	Geo. N. Holland, guano, &c	37 35
	Stott & Cromwell, drugs, &c	5 50
	Geo. King, leather	26 04
	Wm. H. Hoover, meat	154 00
	Wm. W. McCullough, lumber	32 89
	Wm. M. Galt & Co., flour	307 60
	Wm. R. Riley, dry goods	246 16
	Geo. M. Oyster & Co., butter	64 56
	Wm. Ballantyne & Son, stationery	6 13
	Henry Franc, hats	58 50
	H. Hollander, tableware	22 00
	Geo. Ryneal, jr., paint, &c	18 50
	Geo. Watts, tableware	23 25
	Hume, Cleary & Co., groceries	84 73
	Browning & Middleton, groceries	91 37
	W. McDevitt, wages, May	7 00
	Samuel Morse, wages, May	8 00
	Tobias Talbert, seed-corn	8 00
	Gray & Noyes, iron stairs	288 00
	John W. Gheen, hack hire	8 00
	John A. Baker, seed, &c	52 99
	H. O. Towles, iron bedsteads	61 00
	W. B. Williams, furniture	41 85
	S. C. Mullin, superintendent, pay-roll, June	799 33
	S. C. Mullin, superintendent, sundries	37 75
	Wm. McDevitt, wages, June	7 00
	Samuel Morse, wages, June	8 00
	Mann Simms, wages, June	4 50
	Levi Sims, wages, June	5 50
	Herbert Brown, wages	5 50
	Samuel Perry, wages	4 00
	Charles A. Wells, medical services	22 00
	Edward Derby, carpenter work	34 50
	M. Lauxman, wagon tires	3 00
	Tobias Talbert, seed-corn	4 00
	W. B. Williams, furniture	23 00
	Geo. Watts, water cooler	8 50
	Gaff, Fleischman & Co., yeast	3 42
	J. B. Olcott & Son, hack hire	18 00
	Gibson Bros., printing	15 25
	K. Kneessi, harness	9 75
	National Capital Telephone Co., telephone service	146 00
	J. D. Free, jr., papers	14 43
	Washington Gas-Light Co., gas, April	38 00
	Washington Gas-Light Co., gas, May and June	64 00
	Geo. Ryneal, jr., paint, &c	13 38
	Geo. Breitbarth, agent, furniture	22 00
	Barbour & Hamilton, groceries	99 15
	Geo. M. Oyster & Co., butter	51 83
	Geo. N. Holland, guano, &c	53 51
	Wm. M. Galt & Co., flour, &c	181 84
	Stott & Cromwell, drugs	6 75
	Geo. King, leather	21 27
	Browning & Middleton, groceries	95 06
	Wm. H. Hoover, meat	152 25
	John A. Baker, tools, &c	80 32
	Hume, Cleary & Co., groceries	99 61
	H. Adler, agent, dry goods	5 80

1881.		
June.	Wm. R. Riley, dry goods	$102 72
	H. Hollander, kitchenware	7 73
	S. W. Curriden, services to June 30	125 00
	Wm. B. Peddrick, services to June 30	25 00
	Johnson Bros., coal	5 90
	John Bell, horses	285 00
	Thos. Geary, hack hire	3 00
	Danl. Hannan, plumbing	15 00
	S. C. Mullin, sundries	10 98
	Z. W. Kessler, salary	8 30
	John A. Baker, farm wagon	85 00
	J. K. Probey, wagons	310 00
	Wm. H. Hoover, cows	110 00
	Columbia Railway Company, manure	107 80
	Notley Anderson, new doors, &c	36 50
	McKelden & Co., pipe, &c	164 45
	Alex Davidson, carriage pole	20 00
	Thomas P. Engel, blacksmith tools	60 00
	John A. Baker, wagons	123 00
	Total disbursements	40,495 90

Report of the physician of the Reform School of the District of Columbia.

WASHINGTON, *July* 1, 1881.

GENTLEMEN: I have to report that during the fiscal year just ended the school has been happily free from contagious disease, and that there has been no fatal illness or serious accident among the boys. The ventilation of the dormitories is now excellent, and this has conduced greatly to the comfort and health of the inmates.

Very respectfully,

CHAS. A. WELLS, M. D.,
Attending Physician.

The TRUSTEES OF THE REFORM SCHOOL, D. C.

REFORM SCHOOL, DISTRICT OF COLUMBIA,
Washington, October 10, 1881.

GENTLEMEN: In compliance with the resolution of August —, 1881, we, the undersigned committee, have the honor to submit the following report:

We visited the following reformatories, viz: House of the Good Shepherd and House of Refuge, in Baltimore, Md.; House of Refuge, Philadelphia, Pa.; New York House of Refuge, at Randall's Island, and the New York Catholic Protectory, at West Chester, N. Y.; House of Reformation, Deer Island, Boston Harbor; Marcella Street Home, Boston; and Massachusetts State Reform School, at Westboro, Mass., in all of which we were received courteously, and every facility offered for a thorough examination, particularly bearing upon the subject of the industries of those institutions.

It would not be amiss, perhaps, to state here that we saw much in the management of those institutions that would be of advantage for us to follow.

* * * * * * *

We found in some of those institutions a much higher standard of education than we have hitherto aspired to. In some instances, where a

boy showed any particular ability in mathematics, drawing, or painting, he was especially encouraged in it, and additional instruction given in those branches. In a few instances the boy was sent outside the institution for instruction, and the result was most happy.

In one of the best institutions we visited, we found that a complete history of each inmate is kept, this record covering a period of many years after his release, thus not only proving to the boy that there was a friendly interest taken in him, but giving the institution a record of the number of reformations, &c. In connection with this subject we beg to submit the accompanying blanks, with the recommendation that some such system be adopted in this school.

Music is recognized in all institutions as not only a source of great pleasure, but as a powerful agent of reformation. To this end brass bands (in some instances, numbering 45 or 50 pieces) are organized, and such boys as show any fondness or ability for music are permitted to learn to play upon some instrument.

We would recommend the adoption or formation of a band, with a regular drill-master, at an early day, believing that its moral effect upon the school will more than compensate for the expense.

As the subject of dormitories and the system of double and single beds had been discussed frequently by this board, we made it the subject of investigation, and were careful in our inquiries in regard to them. In no instance did we find the double bed used, and in no instance did we find that it was customary to allow the boys in their dormitories without a watchman. We also found it to be the general custom to separate the smaller from the larger boys, not allowing them to sleep in the same dormitories only, but keeping them apart as much as possible during the day, at work and at play. This might require additional dormitories, but it is believed to be of sufficient importance to warrant the additional expense. With our present buildings it might not be practicable to make this change, but we believe it to be of the greatest importance to adopt it as soon as possible. It is within our power to adopt the single beds, and we would recommend it at once.

The subject of a girls' reform school has been under discussion in this District for several years. That the necessity for such an institution exists no one can doubt There have been many objections raised and doubts expressed as to the propriety of building a separate institution for girls and incurring the heavy expense necessary for two district institutions, &c. We found generally that the two sexes are combined under one institution, although entirely separate and distinct, with no communication whatever between each other except in the chapel. It is found to be of very great advantage to have the girls do all the washing and ironing as well as the making of clothing for the boys in addition to their own, thus giving a large number of girls work which will be of advantage to them in the future, as well as relieving the boys of that kind of work, and permitting a large number of them to follow such other pursuits and trades as would be to their future benefit.

The combination of the two worked so well in the institutions we saw that we were much impressed with it, and, while being hardly prepared to recommend its adoption here, we would respectfully present the subject to the board for their consideration. If it were considered wise to recommend such a plan to Congress it would necessitate the erection of new buildings, &c. In connection with the subject of new buildings, we would recommend the immediate adoption by the building committee of a plan for the enlargement of the institution for the future to the capacity of accommodation for 1,000, if necessary, with a chapel, hospi-

tal, and such other buildings as would be required in a well-organized and complete institution of the kind. It is important that we now prepare for the future growth of this institution, and that we build on an intelligent and comprehensive plan.

It is now generally regarded as true that the "easiest way to cure crime is to prevent it." Our streets are filled with boys and girls starting on a course of crime and shame. This institution should be a shelter capable of taking a much larger number than we have heretofore thought of, and giving them such mental, moral and religious, and industrial training as they could not otherwise obtain, and from here sent out in due time to good places on farms or in workshops, where they will grow to be virtuous and useful citizens. If we can show to the people of this District and to Congress that we are really elevating and reforming those children committed to us, there need be no fear of a lack of support by our legislators. The above suggestions are outside of the specified object of our visit, yet, while not underrating our own institution, we saw so much that we could adopt with profit to ourselves that we cannot refrain from speaking of some of them.

* * * * * * *

In regard to the industries, as generally adopted by different institutions, we found not a great variety, but enough to make the recommendation of any a subject of very grave consideration. In some of the larger institutions shoe-making, willow-work, printing, sleigh and sled making, knitting stockings, brush-making, and chair-caning are carried on successfully, all of which possess more or less inducements, and in some instances are productive of some profit.

We regret to say, however, that in most institutions the contract system prevails, which we regard as in general prejudical alike to discipline and the reformation of the boy. Labor must not be of the crank or tread-mill character; useless labor is as demoralizing to an inmate of a reform school as it would be to a free man. Labor should be of such a character as would attract and interest the boy and induce in him habits of labor, so that he would realize that by acquiring this habit of labor he would not only be able to earn a comfortable support when discharged, but strengthened in his self-reliance.

The mode of organizing and managing the labor of an institution is a question of much importance, and we approach the subject with no little hesitation. After looking at the matter very carefully, we have come to the conclusion that shoe-making combined more of the elements that we are anxious to procure than any other trade, and would recommend its adoption. It is one that would be of permanent benefit to the boys, which is the primary consideration, as familiarizing them with the use of machinery, making them adept with their hands and quick of thought, besides giving a trade which would be of lasting benefit after they leave the institution. We could find a ready sale for the shoes in our own market, thus securing a better price for them, and enabling us to manufacture such quantity and quality as may be demanded. We would suggest, for the present, that we confine ourselves to the manufacture of ladies' and misses' shoes, or ties, as being simpler and easier to learn, and also being less expensive to manufacture.

It must be borne in mind that the establishment of this industry will take several months before we can begin to see any results, or reap any reward from it, and very much of our success will depend upon the party whom we may secure to manage the business. We spent much time in examining the machinery to be used and in securing bids for the same. We submit herewith an estimate, amounting to $1,665, which

we believe will cover all that will be required at first. This estimate is for second-hand machines, and is about 30 per cent. less than original cost.

It is believed by all whom we consulted, that a machine which has been carefully used for a short time is absolutely better than a new one. The parties who submit the accompanying estimates are responsible, and we have every reason to believe that the estimate is a favorable one in every respect. In the event of our purchasing such machinery we would have the advice of a manufacturer and a personal friend of your committee. The stock required would cost from $500 to $1,000 to commence with.

There may be some points of minor importance upon this subject that we have not touched, but we gave the matter much time and thought, and are so well satisfied with the result that we would urge that immediate steps be taken toward the adoption of this branch of industry.

We do not wish to be understood as recommending this as the only labor for this institution, for we trust the day is not far distant when we shall have one or two others, and that our hill-sides will not only abound with the products of the soil, but that the air may be filled with the hum and buzz of machinery, blended with the merry voices of active, healthy, and happy youth.

Very respectfully,

R. JOSEPH,
THOS. P. MORGAN,
Committee.

The BOARD OF TRUSTEES OF THE REFORM SCHOOL,
District of Columbia.

EXHIBIT S.

Report of the warden of the jail.

SIR: In obedience to the provisions of an act of Congress approved March 5, 1872, I have the honor to submit the following report of the United States jail in the District of Columbia for the year ended October 31, 1881.

The health and general sanitary condition of the prison have as a rule been good. No contagious diseases or fevers of a malignant type have appeared in the institution during the year. The sickness and diseases which have afflicted the inmates have been of the character for the most part, which were induced by their irregular habits and vicious practices previous to their incarceration, and existed at the time of their arrival at the jail, except that we have been troubled with a greater degree of malarial disturbances, and have had a larger number of cases arising therefrom than during previous years. All such cases, however, have yielded readily to medical treatment, and now at the close of the year the health of the inmates is as good as could be hoped or expected. One death only has occurred and that was caused by diseased condition of the heart and lungs with which the subject was afflicted when he arrived at the institution. The prison has been visited daily by its physician, Dr. Noble Young, whose large experience in treating the unfortunate classes, has adapted him to the duties of his position, and he has faithfully and skillfully attended and treated the sick as their respective complaints seemed to require. His report is hereto annexed and referred

to, as it exhibits more definitely and in a professional manner the degree of health and general sanitary condition that have been maintained during the year. Experience has shown me that competent training and practical knowledge are prerequisite qualifications for persons charged with the custody and treatment of the criminal classes. Most of the officers employed here have proven by works that they are possessed of those important acquirements and have discharged their duties efficiently. Good discipline has been thoroughly maintained while the inmates have been treated in a humane and conciliatory spirit. Order, quietude, cleanliness, and freedom from foul odors and noxious gasses have been distinguishing features of the institution, and have only been secured by the sleepless vigilance of the officers in charge.

No prisoner has escaped but all have been safely kept to answer the purposes of their imprisonment. They have been supplied with a reasonable amount of wholesome and nutritious food, suitable beds and bedding, and with comfortable quarters. Such as were destitute of clothing and were friendless and were utterly unable to procure a supply for themseves were furnished with such articles, and such only, as were actually necessary to render them comfortable and their presence endurable.

It may be remarked that most of the persons committed to this jail are under the age of thirty years. A career of crime is rarely commenced by one who has advanced beyond that age. Some who enter upon a vicious life early in youth continue criminal practices to later years, but the cases are rare indeed where they persist in such a course until old age is reached. The beginning is usually by the perpetration of petty offences, and then progressing to graver crimes as time goes on, and finally reaching to such horrid deeds as shock the sensibilities of the community and forever blight the character, hopes, and propects of the offender. Such a beginning is more frequently than otherwise an outgrowth of evil companions and corrupt associations, arising often from want of proper culture and wholesome restraint in childhood and youth. If parents and guardians thoroughly comprehended and appreciated these facts, and would exert themselves promptly and properly in efforts to prevent the early tendencies of their children and wards to go at will in idleness with vicious companions, they would thereby prevent much crime and save themselves from the burden of much grief and heart-trouble later in life. They would also thus prevent many of those who are dear to them from falling to the condition of outcasts, and save them to become useful citizens and to contribute to the comfort and happiness of their protectors in later years.

As has been the practice in previous years religious services have been held at the jail quite regularly under the auspices of the Young Men's Christian Association, white and colored, of this city; besides moral instruction has been imparted to the inmates by certain evangelists and by a delegation of ladies from the Woman's Christian Temperance Union of this city, with as favorable results as could reasonably have been expected.

The jail building is a substantial structure, ample in capacity, complete in its arrangements, and of great strength. It, however, is situated in an isolated place, and one great want has not been provided for, that is, an inclosing wall around the premises. The want of a suitable inclosing wall has been seriously felt, from time to time, since the building was first occupied. It never perhaps was so greatly needed as during the past summer, and down to the present time, its want has frequently been the cause of great annoyance and serious apprehensions to those responsible for the reputation of the institution and the safe-

keeping of its inmates, and has contributed materially to the cost of guarding the prison. The location is by the Anacostia River, at the extreme eastern limits of the city, away from its population and beyond the reach of the city police, whose aid could not be relied on in case of a serious disturbance or disaster. Entire dependence, therefore, for safety and protection has, until recently, rested upon the officers of the institution exclusively, and lately has required a battery of United States Artillery for its protection. I would, therefore, most respectfully suggest that, as a means of greater security and protection as well as a saving of expense in guarding the prison, good suitable walls should be built around the building and premises at an early day.

During the year the building and fences needed some repairs, from time to time, which were made, and they are now in excellent condition. Also, two of the large boilers used for making steam to heat the building, and the steam pipes, furnaces, and heating apparatus generally, together with the force pumps, steam laundry, and steam cooking appliances, required extensive repairs, which were made as needed.

The repairs, for the most part, were made by our own labor, so that the expenditures for the same were mostly for the purchase of material. The expenditures on account of the repairs above mentioned, and including painting and glazing, were $1,306.52. Persons convicted and sentenced by the criminal court of this District to serve a term in a penitentiary are committed to the custody of the warden, whose duty it is made by law to transport them to such penitentiary as may have been designated by the Attorney-General, and specified in their sentences respectively. In the discharge of that duty the warden has transported 28 male and 4 female convicts to the Albany penitentiary, at Albany, N. Y.; 35 male convicts to the State prison at Auburn, N. Y.; and 3 female convicts to the Erie County penitentiary, at Buffalo N., Y.; making, in all, 70 convicts. The entire cost of transporting them was $1,509.92. In compliance with the law in that regard the warden has conveyed and delivered to the Reform School for Boys in the District of Columbia 54 boys, who, having been convicted of crimes in the police and criminal courts of the District, and being under sixteen years of age, were sentenced to a term in that institution.

The salaries of physician, engineer, assistant engineer, guards, firemen, messenger, and cooks were $30,965.40. There was also expended on account of the jail the amounts stated for the following purposes, viz:

Subsistence	$13,499 86
Fuel and lights	4,453 79
Beds, bedding, and clothing	2,953 29
Medicines, medical stores, and delicacies for the sick	444 58
Disinfectants	138 46
Stationery, blanks, and blank books	182 00
Keeping horse, cow, and repairs on wagon and harness	465 15
Furniture, hard and tin ware, cooking utensils, dishes, night tubs, and cell buckets	945 03
Preparing for execution and burial of the dead	50 00
Soap and sal-soda	404 80
Ice and miscellaneous articles	307 31

The daily average number of prisoners confined in jail during the year was 201. The total number imprisoned during the year was 1,947, of whom 1,693 were males and 254 females; of this total number there were pardoned by the President of the United States 9 males and 1 female, and by the Commissioners of the District 6 males. There were sent to the Reform School 54 boys. Seventy convicts were transported to the penitentiaries, of whom 11 were white males; 52 were colored

males. One was a white female and six were colored females. Two males were executed, and 1 male died; 2 males were sent to the United States Hospital for the Insane in the District of Columbia; 1,390 males and 254 females were discharged. Remaining in jail at the close of the year 161 males and 24 females, of whom 45 were white males, 2 white females and 116 colored males, and 22 colored females. There were in jail at the beginning of the year 170 males and 18 females; committed during the year 1,523 males and 236 females. Those that were committed during the year were charged with various offences, which were classified as follows:

	Males.	Females.
Murder	10	1
Resisting Metropolitan police officers	11	.....
Robbery	5	1
Arson	3	.....
Rape	3	.....
Assault with intent to commit rape	3	.....
Burglary	13	.....
Burglary and grand larceny	19	1
Grand larceny	67	10
Counterfeiting	6	2
False pretenses	5	.....
Receiving stolen goods	4	1
Conspiracy	11	2
Forgery	11	.....
Petit larceny	616	82
Bench warrant	21	4
Embezzlement	7	.....
Bigamy	5	1
Violating internal-revenue laws	2	.....
Mailing obscene letters	1	.....
Libel	2	.....
Presenting false claim	1	.....
Assault and battery	377	81
Assault	81	11
Desertion	1	.....
Affray	26	17
Malicious trespass	38	.....
Incorrigibility	13	.....
Keeping policy-shop	1	.....
Selling liquor without license	1	.....
Threats of personal violence	48	2
Contempt of court	9	3
Vagrancy	15	.....
Keeping bawdy-house	.....	2
Keeping disorderly house	3	6
Disorderly assembly	1	.....
Beastiality	1	.....
Carrying concealed weapons	1	.....
United States witnesses	10	2

Of the number who were committed to jail during the year, as above stated, 1,322 were tried, convicted and sentenced; of this number 1,140 were males, and 182 females. There were 70 of them sentenced to serve terms in the penitentiary who were classified as follows:

	White.		Colored.	
	Males.	Females.	Males.	Females.
Murder	.....	.....	1	.....
Assault with intent to kill	1	.....	6	.....
Manslaughter	.....	.....	2	.....
Rape	.....	.....	1	.....
Forgery	1	.....	1	.....
Burglary and larceny	1	.....	5	1
Grand larceny	4	.....	15	4
False pretenses	.....	.....	2	.....
Embezzlement	.....	.....	1	.....
Perjury	.....	.....	2	.....
Second offense petit larceny	4	1	15	1
Assaulting Metropolitan police officer	.....	.....	1	.....

Also, there were of those convicted and sentenced, as before stated, 54 boys, sentenced to the Reform School. They are classified as follows:

	White.	Colored.
Murder	.....	1
Robbery	.....	2
Receiving stolen goods	.....	1
Larceny	5	27
Incorrigibility	3	7
Vagrancy	3	5

The balance of those convicted and sentenced, as before stated, were sentenced to serve terms in jail, and are classified as follows:

	White.		Colored.	
	Males.	Females.	Males.	Females.
Petit larceny	64	10	272	55
Embezzlement	.....	.....	1	.....
Receiving stolen goods	.....	.....	1	.....
Sending threatening letters	1	.....	.....	.....
Assault and battery	67	6	278	74
Assault	11	.....	11	.....
Assaulting Metropolitan police officers	1	.....	9	.....
Keeping policy-shop	.....	.....	1	.....
Affray	3	2	21	15
Threats of personal violence	26	.....	15	3
Contempt of court	2	1	7	1
Keeping disorderly house	.....	1	2	5
Keeping bawdy-house	1	2	.....	.....
Disorderly assembly	1	.....	.....	.....
Trespass	3	.....	24	.....
Vagrancy	1	.....	.....	.....

Very respectfully, your obedient servant,

JOHN S. CROCKER, *Warden.*

Hon. WAYNE MACVEAGH,
Attorney-General United States.

UNITED STATES JAIL, HOSPITAL DEPARTMENT,
October 29, 1881.

SIR: This year is remarkable for the prevalence of malarial disease in this prison to a most unusual extent. This may be fairly attributable to the long-continued drought laying bare the flats in the Anacostia River on our border, and exposing them to the action of a hot sun, as well as rendering the surrounding marshes a moist, slimy, vegetable surface, laid down by all authorities as most productive of the poison causing these diseases. Unfortunately, we may expect this in any year until the channel is cleaned out and these marshes reclaimed by embankments and put under cultivation. The only other diseases occurring have been met, as are referred to, every year, and produced by the vicious habits of those sent here as prisoners. We have had but one death, a case of phthisis pulmonalis in a boy who was the subject of it before he came to the prison. All cases have yielded readily to treatment. All the sanitary means usually practiced in this prison have been most faithfully persevered in. Thorough ventilation, bathing, and

every means of cleanliness, regulated temperature, good and wholesome food, perfect sewerage, and such exercise as our limited resources admit of without a wall around the prison.

I cannot too thoroughly urge the importance of this improvement as giving us the means of safely allowing the prisoners the benefit of such exercise as is indispensable to health. A most interesting and remarkable instance of malingery occurred during the past year. A colored man, a skillful burglar, simulated partial palsy for a period of eight months, commencing with a pretended attempt to hang himself. This was kept up almost unremittingly during the whole period, resisting all the most active and painful appliances to overcome what I knew to be a pretense, until the well-directed use of a galvanic battery overcame the control of his movements and forced into action such muscular motions as were incompatible with a palsied condition, bringing the old fellow to an acknowledgment of his hypocrisy. I have inspected the food and clothing of the prisoners, their cells, and everything connected with them from time to time, and have found everything as it should be on all occasions. The officers have all assisted me efficiently and cheerfully. My assistant in this department renders me always the most skillful and faithful service.

Very respectfully, your obedient servant,

N. YOUNG, M. D,
Physician United States Jail, D. C.

Gen. J. S. CROCKER,
Warden United States Jail, D. C.

47TH CONGRESS, 1st Session. } SENATE. { EX. DOC. No. 5.

LETTER

FROM THE

SECRETARY OF THE INTERIOR,

TRANSMITTING,

In compliance with Senate resolution of May 19, 1881, *a list showing the names of all officers, clerks, and other employés borne upon the rolls of the department.*

DECEMBER 8, 1881.—Ordered to lie on the table and be printed.

DEPARTMENT OF THE INTERIOR,
Washington, December 7, 1881.

SIR: In compliance with Senate resolution of May 19, 1881, I have the honor to transmit herewith a list showing the names of all officers, clerks, and other employés borne upon the rolls of this department, exclusive of those required to be confirmed by the Senate, the salary paid to each, together with the date of their appointment, the State to which each is charged, the grade of office held, the compensation received, and whether each of said officers, clerks, or employés is white or colored, and which of such clerks or employés served in the regular or volunteer service of the United States during the war of the rebellion.

For the purpose of convenient reference the list has been arranged alphabetically by States, and by Congressional districts in each State.

It should be stated that the legal residence of each is given as furnished by the persons themselves, after instructions had been issued to chiefs of bureaus to be particular to report actual legal residence, the crediting of employés to States where they do not actually reside or exercise any of the rights or functions of citizenship not to be accepted as in compliance with said instructions.

The list above referred to has been corrected to October 10, 1881.

I have the honor to be, very respectfully, yours,

S. J. KIRKWOOD,
Secretary.

The PRESIDENT OF THE SENATE.

ALABAMA.

Name.	Grade.	Office.	Date of original appointment.	Date of present appointment.	Present legal residence.		Compensation.
					State.	Congressional district.	
P. G. Glover	Special agent	General Land	Jan. 25, 1881	Jan. 25, 1881	Alabama		$1,200
J. H. Perdue	do	do	Sept. 4, 1878	Sept. 4, 1878	do		1,200
James Bennett†	Messenger	Pension	Apr. 2, 1874	Apr. 2, 1874	do	Sixth	720

ARKANSAS.

Mrs. Harriet C. Stuart	Copyist	Patent	July 1, 1875	July 1, 1878	Arkansas	Second	900
Mrs. Marie L. Mason†	do	General Land	Mar. 1, 1876	Mar. 1, 1876	do	do	900
James W. Donnelley*	Chief of accounts division	do	Oct. 21, 1876	Sept. 1, 1880	do	Third	1,800
Archibald Young	Clerk	do	Apr. 21, 1877	July 1, 1881	do	do	1,400
William E. Stearns	do	Patent	Nov. 16, 1875	Nov. 16, 1875	do	do	1,200
Francis Meagher*	do	Pension	May 28, 1881	May 28, 1881	do	do	1,000
Albert G. Ryan*	Copyist	General Land	Oct. 27, 1879	Oct. 27, 1879	do	do	900
Miss Julia E. Slosson	do	do	Mar. 1, 1877	Jan. 11, 1879	do	do	900
Joseph Morrison†	Watchman	Secretary's	Mar. 8, 1877	Mar. 8, 1877	do	do	720

COLORADO.

Samuel F. Emmons	Geologist	Geological Survey	July 8, 1879	July 8, 1879	Colorado	First	4,000
W. F. Hillebrand	Chemist	do	July 1, 1880	July 1, 1880	do	do	2,000
A. Guyard	Assistant chemist	do	Aug. 1, 1880	July 1, 1881	do	do	1,500
Alfred M. Rogers	Disbursing clerk	do	Apr. 1, 1881	July 1, 1881	do	do	1,500
Charles T. Caldwell	Clerk	Pension	Apr. 8, 1881	July 16, 1881	do	do	1,400
Ernest Jacob	Assistant geologist	Geological Survey	July 1, 1880	July 1, 1880	do	do	1,200
C. Whitman Cross	do	do	Oct. 1, 1880	Oct. 1, 1880	do	do	1,200
John A. Perry	Clerk	Pension	Apr. 8, 1880	June 1, 1881	do	do	1,000
Theodore F. Wilson*	Copyist	do	July 19, 1879	Feb. 10, 1880	do	do	900
Miss Josephine Meeker	do	Indian	Dec. 15, 1879	July 1, 1881	do	do	720
Paul Holman	Assistant topographer	Geological Survey	July 19, 1879	July 1, 1881	do	do	720

CALIFORNIA.

Joseph S. Curtis	Assistant geologist	Geological Survey	Apr. 1, 1881	Apr. 1, 1881	California	First	3,000
Edward S. Kaufman	Clerk	Pension	May 23, 1881	May 23, 1881	do	do	1,200
Frank P. MacLean	do	Patent	Apr. 2, 1880	July 1, 1881	do	do	1,200
Thomas R. Stuart	Draughtsman	do	Apr. 1, 1881	July 1, 1881	do	do	1,000

Alfred Hedberg*	Clerk	Pension	June 1, 1881	June 1, 1881	....do	....do	1,000
Ferd. H. Gerdes, jr*	....do	....do	May 5, 1881	May 5. 1881	....do	....do	1,000
Mrs. Kate Walker	Copyist	....do	May 2, 1876	May 2, 1876	....do	....do	900
George F. Becker	Geologist	Geological Survey	July 8, 1879	July 1, 1880	....do	Second	4,000
William H. Chadsey*	First assistant examiner	Patent	Oct. 1, 1872	June 1, 1875	....do	....do	1,800
Miss Georgie Kenney	Clerk	Pension	Jan. 6, 1874	Sept. 1, 1876	....do	....do	1,200
Mrs. Nellie S. Rapley	Copyist	General Land	June 6, 1877	June 6, 1877	....do	....do	900
Miss Adelina M. Alvarado	....do	....do	Mar. 23, 1881	July 1, 1881	....do	Fourth	840
J. Ramon Carrillo	....do	Secretary's	Feb. 19, 1880	Feb. 19, 1880	....do	....do	720
Ivan Petroff	Special agent	Census	Apr. 23, 1880	Apr. 23, 1880	....do		‡5

CONNECTICUT.

G. Brown Goode	Special agent	Census	July 2, 1879	July 2, 1879	Connecticut		None.
George W. Hawes	....do	....do	Dec. 4, 1880	Dec. 4, 1880	....do		None.
Curtis W. Holcomb	Chief clerk	General Land	Mar. 24, 1871	May 22, 1880	....do	First	2,000
William H. Webster*	Chief of old war and navy div'n	Pension	June 1, 1869	May 1, 1881	....do	....do	2,000
Thomas Mitchell	Clerk	....do	Jan. 20, 1878	Aug. 16, 1880	....do	....do	1,400
Miss Sarah J. Noyes	Third assistant examiner	Patent	Feb. 1, 1873	July 15, 1874	....do	....do	1,400
Charles F. Brown*	Clerk	....do	Sept. 23, 1867	July 1, 1879	....do	....do	1,200
Miss Rebecca H. Elwell	....do	....do	July 1, 1869	Oct. 1, 1873	....do	....do	1,200
Miss Harriet T. Galpin	....do	Indian	Sept. 12, 1873	Aug. 16, 1878	....do	....do	1,000
Mrs. Zelina Root	Copyist	Patent	July 8, 1881	July 8, 1881	....do	....do	720
William A. Cowles	Clerk	General Land	Nov. 25, 1877	July 1, 1881	....do	Second	1,600
Philip G. Russell	Second assistant examiner	Patent	Sept. 12, 1878	Nov. 16, 1880	....do	....do	1,600
Edmund R. Williams*	Third assistant examiner	....do	May 1, 1878	Dec. 1, 1879	....do	....do	1,400
Edward R. Tyler	....do	....do	Jan. 3, 1881	Jan. 3, 1881	....do	....do	1,400
Isaac N. Prior	Clerk	Pension	July 1, 1853	Nov. 15, 1869	....do	....do	1,400
Homer Riggs*	....do	....do	May 7, 1881	May 7, 1881	....do	....do	1,200
Arthur W. Harrison	....do	Patent	Dec. 15, 1875	July 1, 1877	....do	....do	1,200
Miss Isabella S. Post	Copyist	General Land	Mar. 5, 1877	July 1, 1881	....do	....do	1,000
Miss Mary L. Robinson	Clerk	Indian	Aug. 21, 1875	July 26, 1879	....do	....do	1,000
Miss Alice H. Morse	....do	Patent	July 1, 1869	July 1, 1877	....do	....do	1,000
Mrs. Etta S. Chapman	Copyist	....do	Sept. 2, 1878	July 1, 1879	....do	....do	900
Frank C. Doty	Draughtsman	....do	Oct. 1, 1881	Oct. 1, 1881	....do	....do	900
Mrs. Martha C. Saxty	Copyist	....do	July 1, 1875	Mar. 1, 1877	....do	....do	900
Jonathan M. Andrus	do	General Land	Feb. 27, 1880	Feb. 27, 1880	....do	....do	900
William L. Seward*	Attendant model room	Patent	Aug. 14, 1866	July 1, 1878	....do	....do	800
Mrs. Jennette M. Bradley	Copyist	Pension	May 14, 1881	May 14, 1881	....do	....do	720
A. George Wilkinson	Principal examiner	Patent	July 1, 1864	May 15, 1868	....do	Third	2,400
John A. Beckwith*	Clerk	Indian	Feb. 5, 1878	Aug. 1, 1880	....do	....do	1,600
Eleazer H. Ripley*	....do	Pension	June 11, 1869	Nov. 1, 1870	....do	....do	1,400
Louis W. Maxson	Third assistant examiner	Patent	Aug. 16, 1880	Aug. 16, 1880	....do	....do	1,400
L. E. Forrest Spofford*	Clerk	General Land	Mar. 10, 1871	Jan. 1, 1880	....do	....do	1,400
Miss Mary S. Williams	....do	Education	Apr. 18, 1878	July 1, 1881	....do	....do	1,200
Henry W. Hall	....do	Pension	July 23, 1878	May 24, 1881	....do	....do	1,200
John F. Blackmar	Copyist	....do	July 2, 1878	May 15, 1881	....do	....do	900
Miss Clara D. Clark	....do	Patent	Feb. 1, 1877	July 1, 1879	....do	....do	720

*In Army or Navy. †Colored. ‡Per day.

CONNECTICUT—Continued.

Name.	Grade.	Office.	Date of original appointment.	Date of present appointment.	Present legal residence.		Compensation.
					State.	Congressional district.	
Albert M. Wooster	First assistant examiner	Patent	May 5, 1876	Aug. 1, 1880	Connecticut	Fourth	$1,800
George R. Byington	Clerk	do	Feb. 1, 1875	July 1, 1881	do	do	1,400
Mrs. Kate O'Gorman	Laborer	Census	July 22, 1880	July 22, 1880	do	do	360
DELAWARE							
George P. Fisher, jr	Principal examiner	Patent	Nov. 15, 1875	Dec. 16, 1880	Delaware	First	2,400
John M. Dunn*	Special agent	General Land	July 29, 1880	July 29, 1880	do	do	1,500
Angus A. McDonald	Clerk	Pension	May 14, 1879	May 1, 1881	do	do	1,400
Samuel W. F. Draper	do	do	Oct. 1, 1879	May 1, 1881	do	do	1,200
Mrs. Lizzie S. Robinson	Copyist	Patent	Feb. 1, 1877	Aug. 1, 1877	do	do	900
James H. Bell	do	Indian	June 2, 1881	June 2, 1881	do	do	900
Hugh Lyons	Watchman	Secretary's	May 1, 1876	May 1, 1876	do	do	720
Mrs. Margaret E. Urmy	Copyist	Education	July 1, 1879	July 1, 1881	do	do	480
FLORIDA.							
Thomas Hassard	Clerk	Railroads	Feb. 16, 1881	July 1, 1881	Florida	First	†125
James Bell*	do	General Land	Apr. 1, 1877	May 2, 1878	do	do	1,200
Edwin M. Clark*	do	Pension	Apr. 25, 1881	Apr. 25, 1881	do	do	1,000
Charles F. Trill	do	General Land	July 24, 1878	July 1, 1881	do	Second	1,200
Miss Lou E. Southwick	Messenger	Pension	Apr. 8, 1875	Dec. 1, 1875	do	do	840
GEORGIA.							
Charles F. Sawyer*	Chief, agent's division	Pension	June 1, 1872	May 1, 1881	Georgia	First	2,000
Virgil Hillyer	Clerk	do	Jan. 5, 1876	Jan. 5, 1876	do	do	1,200
Charles H. Elkins	do	do	May 14, 1881	May 14, 1881	do	do	1,000
William Hunt*	Watchman	Secretary's	Sept. 22, 1879	Sept. 22, 1879	do	do	720
Miss Marie R. Van Leer	Copyist	Patent	Aug. 11, 1880	July 5, 1881	do	Third	720
Richard D. Locke	Clerk	Pension	Apr. 7, 1881	Apr. 7, 1881	do	Fourth	1,200
Marcellus E. Thornton	do	do	Apr. 7, 1881	Apr. 7, 1881	do	Fifth	1,200
Willis H. Grigsby*	do	General Land	Aug. 1, 1879	Mar. 1, 1881	do	do	1,200
Nesbit Wills	Laborer	Patent	Aug. 26, 1881	Aug. 26, 1881	do	do	360

David M. Turner†	....do	Education	Feb. 8, 1881	July 1, 1881	....do	....do	360
Mrs. Annie M. Peters	Copyist	Patent	July 1, 1875	July 1, 1875	....do	Sixth	900
Eugenius N. Reid	Clerk	Pension	Apr. 9, 1881	Apr. 9, 1881	....do	Ninth	1,200
Jacob G. Hutchins	....do	....do	Apr. 7, 1881	July 29, 1881	....do	....do	1,000

ILLINOIS.

Robert J. Fisher, jr	Principal examiner	Patent	Dec. 21, 1875	Aug. 1, 1880	Illinois	First	2,400
Robert P. Cady	Clerk	Indian	May 1, 1870	Apr. 1, 1878	....do	....do	1,400
Matthew B. Johnston	....do	Pension	Apr. 19, 1874	Apr. 19, 1874	....do	....do	1,400
Mrs. Helen M. Avery	....do	Secretary's	Aug. 22, 1876	July 1, 1880	....do	....do	1,400
Isaac B. Dunn	....do	Pension	Apr. 4, 1874	Mar. 1, 1875	....do	....do	1,400
Henry M. Wright	....do	Education	July 1, 1878	July 1, 1881	....do	....do	1,200
Peter B. Cook	....do	Indian	June 1, 1881	June 1, 1881	....do	....do	1,000
Mrs. Sarah M. Everson	Copyist	Patent	July 16, 1872	Aug. 1, 1877	....do	....do	900
Mrs. Carrie Bower	....do	Pension	Sept. 1, 1880	Sept. 1, 1880	....do	....do	720
James E. Allen	Clerk	Geological Survey	Apr. 1, 1881	July 1, 1881	....do	....do	720
Charles Warren*	Chief clerk	Education	Oct. 1, 1870	July 1, 1872	....do	Second	1,800
William Grinsted*	Clerk	Pension	June 1, 1871	Apr. 1, 1873	....do	....do	1,800
Thomas H. McBride*	....do	....do	May 11, 1877	May 1, 1881	....do	....do	1,600
Charles H. Adams*	....do	....do	May 21, 1881	May 21, 1881	....do	....do	1,400
James S. Erly*	....do	....do	Apr. 7, 1881	Apr. 7, 1881	....do	....do	1,200
Webb C. Wilkinson*	....do	....do	May 26, 1881	May 26, 1881	....do	....do	1,200
Charles H. Mixer	Copyist	Patent	July 5, 1881	July 5, 1881	....do	....do	900
Charles A. Bell*	....do	Pension	Jan. 5, 1880	Jan. 5, 1880	....do	....do	900
Mrs. Rosa B. Niles	....do	General Land	May 9, 1878	May 9, 1878	....do	....do	900
George Prince*	Watchman	Secretary's	May 1, 1877	May 1, 1877	....do	....do	720
Louis Reinburg*	Clerk	Pension	May 3, 1876	May 1, 1881	....do	Third	1,400
David J. Hussy*	....do	....do	Apr. 17, 1881	Apr. 17, 1881	....do	....do	1,200
John P. O'Neill*	....do	....do	May 25, 1881	May 25, 1881	....do	....do	1,200
Miss Eleanor T. Chester	....do	Education	July 1, 1872	July 1, 1881	....do	....do	1,000
Mrs. Alice M. Goodwin	....do	Pension	July 15, 1871	May 1, 1881	....do	....do	1,000
Julius Gosch*	Watchman	Secretary's	Feb. 17, 1879	Feb. 17, 1879	....do	....do	720
Albert F. Kingsley*	Clerk	Pension	June 14, 1871	May 1, 1881	....do	Fourth	1,800
Charles F. Randall	Second assistant examiner	Patent	Oct. 1, 1876	Aug. 16, 1880	....do	....do	1,600
William A. Moore*	Clerk	General Land	Nov. 4, 1875	Jan. 1, 1880	....do	....do	1,400
Benjamin F. Chase*	....do	Pension	Jan. 8, 1876	Jan. 8, 1876	....do	Fifth	1,200
Urbane A. Denison*	....do	....do	Apr. 6, 1863	May 1, 1881	....do	Sixth	1,800
John M. Welty*	....do	....do	July 24, 1871	Mar. 1, 1875	....do	....do	1,400
Thomas W. Eustace	....do	General Land	Aug. 1, 1874	Nov. 1, 1878	....do	....do	1,200
James B. Littlewood*	Third assistant examiner	Patent	Feb. 1, 1877	July 1, 1881	....do	Seventh	1,400
Avery N. Beebe	Clerk	Pension	May 14, 1881	May 14, 1881	....do	....do	1,200
Eugene B. Clark	First assistant examiner	Patent	May 23, 1870	Oct. 10, 1881	....do	Eighth	1,800
John H. Renshawe	Topographer	Geological Survey	July 8, 1879	July 8, 1879	....do	....do	1,800
Charles T. Heinecke*	Clerk	Pension	Oct. 1, 1863	Mar. 1, 1875	....do	....do	1,400
Mrs. Nettie Surbridge	....do	....do	June 6, 1871	July 16, 1881	....do	....do	1,200
Claes E. Westling	....do	....do	Apr. 7, 1881	Apr. 7, 1881	....do	Ninth	1,200
Mrs. Caroline A. Dolbear	Copyist	Patent	Dec. 1, 1871	Dec. 1, 1880	....do	....do	900

*In Army or Navy. †Colored. ‡Per month.

ILLINOIS—Continued.

Name.	Grade.	Office.	Date of original appointment.	Date of present appointment.	Present legal residence.		Compensation.
					State.	Congressional district.	
Mrs. Lizzie M. Matteson	Copyist	Patent	Feb. 1, 1877	Feb. 1, 1877	Illinois	Ninth	$900
Samuel R. Edwards*	Clerk	General Land	Mar. 20, 1871	Feb. 1, 1880	do	Tenth	1,600
John K. Boude*	do	Pension	Apr. 7, 1881	Apr. 7, 1881	do	do	1,200
Albert L. Pitney*	do	General Land	Aug. 1, 1874	July 1, 1881	do	Eleventh	1,400
Mrs. A. H. Woodall	do	Patent	Jan. 1, 1872	May 1, 1878	do	do	1,000
Allen M. Shepard*	Copyist	Pension	May 13, 1880	May 13, 1880	do	do	900
John Mayhew	Clerk	do	Apr. 5, 1867	Nov. 1, 1875	do	Twelfth	1,400
William W. Hays*	do	do	June 19, 1871	July 15, 1881	do	do	1,200
Oliver C. Sabin	do	do	Apr. 28, 1881	Apr. 28, 1881	do	Thirteenth	1,800
James A. Hovey	First assistant examiner	Patent	Apr. 1, 1879	Aug. 1, 1880	do	do	1,800
Frank D. Orme	Clerk	General Land	Apr. 1, 1863	Aug. 1, 1878	do	do	1,400
Mrs. Harriette F. Hovey	do	Education	Sept. 24, 1878	July 1, 1880	do	do	1,200
Oscar Whitney	do	General Land	Mar. 5, 1877	Jan. 23, 1878	do	do	1,200
Miss Mary E. Torrence	Copyist	Patent	Aug. 1, 1879	July 1, 1881	do	do	900
Miss Marie C. Reinertson	do	General Land	July 27, 1881	July 27, 1881	do	do	900
James W. Somers	Clerk	Pension	Apr. 24, 1861	Aug. 1, 1879	do	Fourteenth	1,600
Andrew B. Rogerson*	do	Indian	June 1, 1869	July 1, 1880	do	do	1,400
Mrs. Alice E. Culver	do	do	Apr. 26, 1879	Feb. 1, 1881	do	do	1,000
George Vellam	Copyist	Pension	Dec. 19, 1878	Dec. 19, 1878	do	do	900
Orlando B. Lester	do	Patent	July 5, 1881	July 5, 1881	do	do	900
Woodford D. Harlan*	Clerk	General Land	Dec. 21, 1865	Oct. 1, 1873	do	Fifteenth	1,600
Daniel L. Gold	do	Pension	Apr. 9, 1881	July 16, 1881	do	do	1,400
Ferdinand D. Stephenson*	Chief of middle division	do	June 1, 1869	July 1, 1881	do	Sixteenth	2,000
Hugh Moore*	Clerk	do	Feb. 14, 1877	Feb. 14, 1877	do	do	1,200
Miss Mary S. McKee	do	Patent	Jan. 1, 1876	July 1, 1877	do	do	1,000
James E. Johnson	do	Pension	Aug. 10, 1879	July 16, 1881	do	Seventeenth	1,200
William W. Bliss*	Lieutenant of the watch	Secretary's	May 13, 1880	July 16, 1881	do	do	840
Casper A. Weber*	Watchman	do	Feb. 12, 1880	Feb. 12, 1880	do	do	720
Francis A. Halliday*	Clerk	Indian	May 11, 1881	May 11, 1881	do	Eighteenth	1,600
Patrick Flynn	Special agent	General Land	Dec. 29, 1880	Dec. 29, 1880	do		1,200

INDIANA.

Zebulon B. Sturgus	Chief, land and railroad division	Secretary's	Feb. 1, 1865	Apr. 1, 1867	Indiana	Third	2,000
Chapin T. Green	Clerk	Pension	Apr. 7, 1881	Apr. 7, 1881	do	do	1,400
Mark Tilton	do	do	July 13, 1878	May 24, 1881	do	Fourth	1,400
Benjamin Vail, jr	do	do	May 12, 1881	May 12, 1881	do	do	1,200
Miss Rachel P. Sturgus	Copyist	Secretary's	May 8, 1872	July 1, 1873	do	do	900

ett	Second assistant examiner	Patent	Nov. 14, 1864	Aug. 1, 1872	do	Fifth	1,600
Alden*	Clerk	Pension	Apr. 7, 1881	Apr. 7, 1881	do	do	1,400
Morton C. Hunter., jr.	do	do	Apr. 7, 1881	Apr. 7, 1881	do	do	1,400
Robert J. Kirkwood	do	do	May 28, 1881	May 28, 1881	do	do	1,200
John Garrett	Watchman	do	Sept. 13, 1881	Sept. 13, 1881	do	do	720
Richard A. Durnan	Copyist	Patent	Aug. 5, 1881	Aug. 5, 1881	do	Sixth	900
J. Dempster Smith	Chief of railroads division	General Land	June 1, 1877	July 1, 1881	do	Seventh	1,800
William W. Curry*	Examiner	Pension	Apr. 7, 1881	Apr. 7, 1881	do	do	1,800
Charles H. Dickson*	Clerk	Indian	Feb. 12, 1879	Aug. 1, 1880	do	do	1,400
William S. Bell*	do	Pension	May 9, 1881	May 9, 1881	do	do	1,000
Charles A. Barnes	do	do	Jan. 28, 1879	Apr. 1, 1880	do	do	1,000
Miss Carrie Russell	Copyist	Education	July 1, 1879	July 1, 1881	do	do	900
Miss Charlotte McVay	do	Patent	Mar. 16, 1877	July 1, 1881	do	do	900
William C. Mason*	do	Pension	June 3, 1880	May 1, 1881	do	do	900
Joel Radebaugh	Watchman	Secretary's	Sept. 18, 1878	Sept. 18, 1878	do	do	720
Frank M. Heaton	Clerk	General Land	Mar. 16, 1861	Jan. 1, 1865	do	Eighth	1,600
John Bresnahan*	do	Pension	Sept. 17, 1864	Oct. 23, 1876	do	do	1,200
Adolph Derndinger*	do	do	June 2, 1881	July 29, 1881	do	Ninth	1,000
Harry P. DeVol	Copyist	Patent	July 5, 1881	July 5, 1881	do	do	900
Miss Clara O. Brawley	do	Pension	Mar. 22, 1875	Mar. 22, 1875	do	do	900
Theodore F. Stokes	Clerk	General Land	May 28, 1861	Mar. 3, 1866	do	Tenth	1,600
Thomas J. Brown	do	Pension	Oct. 26, 1878	May 1, 1881	do	do	1,000
Mrs. Lucy Heaton	do	do	Dec. 7, 1872	May 1, 1881	do	do	1,000
Mrs. Livonia M. Taylor	Copyist	do	July 7, 1874	Sept. 1, 1876	do	Twelfth	900
Thomas S. Cogley*	Examiner	do	Apr. 10, 1881	Apr. 10, 1881	do	Thirteenth	2,000
Charles M. Heaton	Clerk	General Land	May 28, 1861	Apr. 24, 1877	do	do	1,200
Miss Amelia Holmes	Copyist	Patent	June 1, 1877	June 1, 1877	do	do	900
Miss L. Belle Hamlin	do	General Land	Dec. 19, 1878	Dec. 19, 1878	do	do	900

IOWA.

Ephraim Killpatrick	Clerk	General Land	Mar. 25, 1865	Apr. 18, 1870	Iowa	First	1,600
Oscar H. Herring	do	do	Feb. 27, 1880	Mar. 3, 1881	do	do	1,200
Abraham Wilkin*	do	Pension	Apr. 7, 1881	Apr. 7, 1881	do	do	1,200
John P. Grantham	do	General Land	Jan. 8, 1870	May 1, 1877	do	do	1,200
Ralph P. Lowe	Draughtsman	do	Oct. 10, 1881	Oct. 10, 1881	do	do	1,000
Miss Maggie A. Walker	Copyist	do	Oct. 5, 1878	Oct. 5, 1878	do	do	900
Miss Mary E. Caldwell	do	Patent	Dec. 1, 1874	Feb. 1, 1877	do	do	900
Miss Jennie F. Skinkle	do	General Land	Nov. 16, 1880	Mar. 18, 1881	do	do	840
Miss Martha A. Walker	do	Pension	May 27, 1881	May 27, 1881	do	do	720
David H. Goodno*	Clerk	General Land	May 28, 1865	July 1, 1881	do	Second	1,400
Mordecai Mobley	Examiner	Pension	Apr. 11, 1881	Apr. 11, 1881	do	Third	2,000
Robert P. Minshall	Clerk	do	June 24, 1878	May 1, 1881	do	do	1,400
Mrs. Mary Barker	do	General Land	May 27, 1872	Oct. 1, 1878	do	do	1,400
John S. Williams	do	do	Aug. 8, 1879	Aug. 8, 1879	do	do	1,200
John L. McCreery	do	Secretary's	Apr. 20, 1881	Apr. 20, 1881	do	do	1,200
Lewis I. Sturgis	do	Pension	Apr. 7, 1881	Apr. 7, 1881	do	do	1,000
Miss Frank De Mowbray	Copyist	Patent	July 1, 1875	July 1, 1877	do	do	900
Miss Mary Murphy	do	General Land	Aug. 1, 1879	Mar. 1, 1880	do	do	900

* In Army or Navy.

IOWA—Continued.

Name.	Grade.	Office.	Date of original appointment.	Date of present appointment.	Present legal residence.		Compensation.
					State.	Congressional district.	
Daniel B. Gallatin*	First assistant examiner	Patent	May 1, 1871	Dec. 16, 1880	Iowa	Fourth	$1,800
Henry J. Harrison	Clerk	General Land	Apr. 1, 1871	Mar. 1, 1881	do	do	1,600
Cassius M. Thomas	do	Pension	May 2, 1876	July 16, 1881	do	do	1,400
James R. Fletcher	do	General Land	Aug. 5, 1881	Aug. 5, 1881	do	do	1,400
Mrs. H. P. McQuesten	do	Pension	Apr. 30, 1873	July 14, 1881	do	do	1,200
Hiram A. Kingsley	Copyist	do	July 7, 1879	July 1, 1880	do	do	720
Frank B. Pickerill	Bookkeeper	Railroads	Apr. 11, 1881	July 11, 1881	do	Fifth	2,400
George B. Edmonds*	Law clerk	General Land	Feb. 27, 1879	Feb. 27, 1879	do	do	2,000
William McE. Dye*	Clerk	Pension	Apr. 20, 1881	Apr. 20, 1881	do	do	1,800
John P. Driver*	do	General Land	Aug. 24, 1865	May 1, 1870	do	do	1,400
Abel Beach	do	Pension	Aug. 3, 1881	Aug. 3, 1881	do	do	1,200
Hiram W. Love*	do	Patent	Feb. 1, 1877	July 1, 1878	do	do	1,000
Mrs. A. D. Hutchins	Copyist	do	July 15, 1881	July 15, 1881	do	do	720
Oscar Woodward	First assistant examiner	do	Feb. 1, 1874	May 1, 1878	do	Sixth	1,800
Miss Elizabeth Denham	Copyist	Pension	Feb. 8, 1877	Feb. 8, 1877	do	do	900
Thomas H. Morris*	do	do	Apr. 26, 1881	Apr. 26, 1881	do	do	900
Samuel H. Chapman*	Messenger	do	Apr. 12, 1881	Apr. 12, 1881	do	do	720
George Albertson*	Clerk	do	Apr. 7, 1881	Apr. 7, 1881	do	Seventh	1,400
Thomas L. Dilley*	do	do	Mar. 1, 1865	July 15, 1881	do	do	1,400
George Christ	do	Secretary's	May 16, 1881	May 16, 1881	do	do	1,200
Miss Haidee Williamson	do	do	Sept. 2, 1876	Mar. 16, 1881	do	do	1,200
James A. Crystal*	Watchman	Pension	May 1, 1881	May 1, 1881	do	do	720
Charles H. Babbitt*	Clerk	General Land	June 1, 1877	July 1, 1881	do	Eighth	1,600
Samuel V. Proudfit	do	Pension	Apr. 7, 1881	Apr. 7, 1881	do	do	1,400
E. D. Godfrey*	do	do	Apr. 7, 1881	Apr. 7, 1881	do	do	1,400
Samuel W. McElderry*	do	do	Apr. 7, 1881	Sept. 1, 1881	do	do	1,200
Andrew Downing*	do	do	Apr. 7, 1881	Apr. 7, 1881	do	Ninth	1,400
Charles K. Myers	do	do	Apr. 11, 1881	Apr. 11, 1881	do	do	1,200
Miss F. M. Arkwright	Laborer	Patent	May 6, 1881	May 6, 1881	do	do	480
Charles C. Horton*	Special agent	General Land	June 13, 1881	June 13, 1881	do		1,400
Thomas Harlan	do	do	May 10, 1881	May 10, 1881	do		1,200

KANSAS.

Edwin P. Hanna	Stenographer	Secretary's	July 21, 1875	Jan. 1, 1879	Kansas	First	1,800
William H. Johnson	Clerk	Pension	Apr. 8, 1881	Oct. 1, 1881	do	do	1,400
William S. Burton	do	do	Apr. 7, 1881	Oct. 1, 1881	do	do	1,400
Mrs. Sarah J. Neal	do	do	June 2, 1875	Apr. 1, 1879	do	do	1,000
Mrs. Annie G. Gaston	Copyist	do	July 13, 1878	July 13, 1878	do	do	900

James S. Phillips	do	Railroads	Sept. 6, 1881	Sept. 6, 1881	do	do	900
William M. Thomas*†	Laborer	General Land	July 20, 1881	July 20, 1881	do	do	660
Alexander R. Banks	Examiner	Pension	Apr. 7, 1881	Apr. 7, 1881	do	Second	2,000
William Hutchinson	Clerk	do	Sept. 12, 1861	Aug. 1, 1875	do	do	1,800
John K. Rankin*	do	do	Apr. 7, 1881	Apr. 7, 1881	do	do	1,800
Paul H. Berkau	do	do	May 30, 1863	Nov. 1, 1875	do	do	1,600
Alfred G. McKensie	Chief, timber depredations div'n	General Land	July 23, 1876	July 25, 1881	do	do	1,600
James W. McMillan*	Clerk	Pension	May 5, 1875	Nov. 1, 1875	do	do	1,400
Calvin S. Brown*	do	General Land	July 2, 1879	July 1, 1881	do	do	1,400
Arch. M. McLachlen	do	Pension	Apr. 14, 1881	Apr. 14, 1881	do	do	1,200
Mrs. Julia A. Holmes	do	Education	July 1, 1870	July 1, 1881	do	do	1,200
Miss Clara M. Archibald	Copyist	General Land	Jan. 5, 1875	Jan. 5, 1875	do	do	900
George C. Johnston*	Watchman	Secretary's	Jan. 1, 1881	Jan. 1, 1881	do	do	720
John Wiggins*	Laborer	Patent	Oct. 1, 1879	Oct. 1, 1879	do	do	660
Miss Mary A. Downey	do	do	Aug. 2, 1872	July 8, 1881	do	do	360
James F. Medbery	Clerk	Pension	Apr. 27, 1871	June 1, 1881	do	Third	1,600
Clarence Bryant	do	do	Apr. 8, 1881	Apr. 8, 1881	do	do	1,200
Miss Eva F. Evans	Copyist	General Land	Sept. 7, 1881	Sept. 7, 1881	do	do	720
John Puterbaugh	Special agent	do	Oct. 10, 1881	Oct. 10, 1881	do		1,200

KENTUCKY.

Miss Ella Hawes	Copyist	Patent	Jan. 11, 1878	July 1, 1881	Kentucky	Second	900
Miss Nellie M. Beach	do	do	June 6, 1877	July 1, 1879	do	do	900
Hugh Nealy	Clerk	Pension	Oct. 1, 1863	July 16, 1881	do	Third	1,200
Frank Brown	Second assistant examiner	Patent	Nov. 15, 1875	Sept. 1, 1878	do	Fifth	1,600
William P. Thomas	Copyist	Pension	Aug. 2, 1878	Aug. 2, 1878	do	do	900
W. J. McCord	Clerk	Geological Survey	July 1, 1881	July 1, 1881	do	do	720
Mrs. Isadore T. Young	Copyist	Pension	May 16, 1881	May 16, 1881	do	do	720
Walter H. Knight	Third assistant examiner	Patent	Aug. 16, 1880	Aug. 16, 1880	do	Sixth	1,400
Everett T. Getchell*	Clerk	Pension	Apr. 14, 1880	May 1, 1881	do	do	1,000
John G. Hubbel	Copyist	Census	July 14, 1880	July 14, 1880	do	do	720
Hugh Harkins*	Clerk	Patent	May 21, 1868	July 1, 1881	do	Seventh	1,000
W. Lee White*	do	Pension	Apr. 1, 1871	Sept. 1, 1871	do	Eighth	1,200
E. Magoffin Hardin	Copyist	Railroads	Aug. 22, 1881	Aug. 22, 1881	do	do	900
Miss Kate King	do	Pension	May 11, 1881	May 11, 1881	do		720

LOUISIANA.

Thomas Shailer	Clerk	Pension	Sept. 1, 1875	Mar. 1, 1877	Louisiana	First	1,400
Dennis T. Kirby*	do	do	Apr. 7, 1881	Apr. 7, 1881	do	do	1,200
Miss Helen W. Smith	do	do	May 5, 1875	May 1, 1881	do	do	1,000
George Kellogg*	do	do	Aug. 15, 1881	Aug. 15, 1881	do	Second	1,400
James M. Pollard*	do	Patent	May 1, 1881	July 1, 1881	do	do	1,000

*In Army or Navy. †Colored.

LOUISIANA—Continued.

Name.	Grade.	Office.	Date of original appointment.	Date of present appointment.	Present legal residence.		Compensation.
					State.	Congressional district.	
William H. Smith†	Laborer	Pension	Jan. 10, 1876	Jan. 10, 1876	Louisiana	Fourth	$660
Charles B. Anderson	Clerk	...do	May 25, 1881	May 25, 1881	...do	Sixth	1, 200
George T. Sewall†	Messenger	Secretary's	Feb. 16, 1877	July 1, 1878	...do	...do	660
Elisha Warfield	Special agent	General Land	Oct. 4, 1881	Oct. 4, 1881	...do		1, 200

MAINE.

Alonzo Weeks	Clerk	Pension	Mar. 24, 1864	Aug. 1, 1879	Maine	First	1, 600
Milton S. Roberts*	...do	...do	June 1, 1869	Aug. 15, 1871	...do	...do	1, 600
Benjamin T. Chase	...do	...do	May 24, 1881	May 24, 1881	...do	...do	1, 200
Marcus W. Towne	...do	...do	Apr. 7, 1881	Apr. 7, 1881	...do	...do	1, 200
Charles F. Larabee*	...do	Indian	July 1, 1880	Feb. 1, 1881	...do	...do	1, 200
Albert B. Baker*	...do	Pension	Feb. 19, 1874	May 1, 1881	...do	...do	1, 000
Amos Hadley*	Chief, stationery and printing div.	Secretary's	Aug. 23, 1876	July 1, 1878	...do	Second	2, 000
Aurestus S. Perham*	Clerk	Pension	July 20, 1880	May 1, 1881	...do	...do	1, 200
Miss Lydia P. Haskell	...do	Patent	July 1, 1869	July 1, 1877	...do	...do	1, 000
Charles W. Keys	...do	Pension	Apr. 7, 1881	Apr. 7, 1881	...do	...do	1, 000
George H. Stockbridge	Copyist	Patent	Aug. 20, 1881	Aug. 20, 1881	...do	...do	900
Miss Mary E. Bartlett	...do	...do	Feb. 8, 1877	Dec. 1, 1880	...do	...do	900
Miss Frances G. French	...do	Education	July 1, 1880	July 1, 1880	...do	...do	900
George A. L. Merrifield	Examiner	Pension	June 5, 1865	May 1, 1881	...do	Third	2, 000
Warren L. Pushaw	Clerk	...do	Apr. 1, 1875	July 1, 1878	...do	...do	1, 200
George Butterfield	...do	...do	July 1, 1877	July 1, 1877	...do	...do	1, 200
Mrs. H. M. Ludlow	...do	Patent	Feb. 1, 1875	July 1, 1881	...do	...do	1, 000
Mrs. Nellie E. Shepherd	Copyist	...do	Mar. 1, 1877	Dec. 1, 1880	...do	...do	900
Mrs. Anna T. Seiders	...do	General Land	May 22, 1871	Nov. 1, 1876	...do	...do	900
George W. Wormelle	Clerk	Pension	July 6, 1874	May 1, 1881	...do	Fourth	1, 600
Edward A. Harding	...do	...do	Sept. 11, 1862	Aug. 1, 1879	...do	...do	1, 400
Thomas D. Chamberlain*	...do	...do	Mar. 19, 1879	June 1, 1881	...do	...do	1, 400
Millard K. Page	...do	...do	Oct. 21, 1879	May 24, 1881	...do	...do	1, 200
Mrs. Love L. Foot	...do	...do	Nov. 1, 1878	Apr. 1, 1880	...do	...do	1, 000
Miss G. A. Chamberlain	Copyist	...do	Apr. 7, 1881	Aug. 4, 1881	...do	...do	900
Mrs. Isabella Tracy	...do	...do	Oct. 1, 1879	Oct. 1, 1879	...do	...do	720
John W. Babson	Chief of issue and gazette division	Patent	Feb. 6, 1877	July 1, 1881	...do	Fifth	2, 000
Lorenzo E. Dickey*	Chief of southern division	Pension	May 23, 1866	May 1, 1881	...do	...do	2, 000
Charles L. Whelpley	Clerk	...do	Nov. 7, 1867	Sept. 1, 1881	...do	...do	1, 800
Parker W. Perry	...do	Patent	Aug. 14, 1877	Oct. 1, 1880	...do	...do	1, 400
Fred. K. Swett	...do	Pension	Apr. 7, 1880	May 1, 1881	...do	...do	1, 200

Noah V. Tibbetts	do	do	Dec. 1, 1873	May 1, 1881	do	do	1,200
Edgar J. Perry	do	do	July 3, 1879	May 24, 1881	do	do	1,000
Miss M. A. Patterson	Copyist	General Land	Dec. 23, 1874	Dec. 23, 1874	do	do	900
Mrs. Augusta C. Starkey	do	do	Feb. 1, 1877	Aug. 1, 1878	do	do	900
Henry Gannett	Special agent	Census	June 18, 1880	June 18, 1880			‡6

MARYLAND.

John A. Goldsborough	Third assistant examiner	Patent	Nov. 10, 1874	July 1, 1877	Maryland	First	1,400
Thomas H. Dawson	Clerk	Pension	May 4, 1880	May 24, 1881	do	do	1,200
Mrs. Sallie W. Gardner	Copyist	Patent	July 1, 1876	July 12, 1877	do	do	900
Eldridge S. Davis	Clerk	Pension	June 11, 1879	May 1, 1881	do	Second	1,200
Miss Eva C. Ware	do	do	May 5, 1880	May 1, 1881	do	do	1,000
Miss Rachel A. Belt	Copyist	General Land	June 16, 1881	June 16, 1881	do	do	900
William O. Conway	Clerk	do	Feb. 1, 1854	July 1, 1881	do	Third	1,800
Thomas Cromwell	do	do	June 30, 1859	Feb. 1, 1879	do	do	1,600
George H. Cline	do	do	July 11, 1871	Apr. 1, 1875	do	do	1,400
E. Key Buchanan	do	Pension	Dec. 16, 1878	Apr. 15, 1879	do	do	1,000
William H. McParlin	do	do	Apr. 12, 1880	Apr. 12, 1880	do	do	1,000
Miss Alice C. Hall	Copyist	General Land	June 5, 1880	June 5, 1880	do	do	900
George W. West*	Watchman	Secretary's	Oct. 1, 1872	Oct. 1, 1872	do	do	720
William H. Bell	Copyist	Pension	June 18, 1880	July 1, 1881	do	do	720
James V. Thompson*	Laborer	Patent	July 1, 1881	July 1, 1881	do	do	360
Edward M. Dawson*	Clerk	Secretary's	Aug. 22, 1868	July 1, 1878	do	Fourth	1,800
Edmund F. Witmer	do	do	Aug. 5, 1880	Jan. 1, 1881	do	do	1,600
Ernest Szemelényi	Translator	Patent	Mar. 23, 1881	Mar. 23, 1881	do	do	1,600
James R. Rogers	Third assistant examiner	do	Feb. 13, 1878	Feb. 13, 1878	do	do	1,400
William H. Wiegel*	Clerk	Pension	July 1, 1877	July 15, 1881	do	do	1,400
Daniel Clarke	do	Patent	Dec. 13, 1877	July 1, 1881	do	do	1,200
Robert F. Thompson	do	Indian	June 16, 1881	June 16, 1881	do	do	1,200
George C. Stewart	do	Pension	Aug. 14, 1879	May 1, 1881	do	do	1,200
Mrs. M. V. E. Mackrille	do	do	June 13, 1875	May 1, 1881	do	do	1,000
Miss Maria L. Dunlevy	Copyist	Patent	July 1, 1869	July 1, 1879	do	do	900
Mrs. Cecelia Kerr	do	do	Dec. 1, 1875	July 1, 1878	do	do	900
Samuel Jones	Watchman	Secretary's	July 16, 1881	July 16, 1881	do	do	720
Aaron R. Townshend	Copyist	Patent	May 1, 1878	May 1, 1878	do	do	660
John H. Adriaans	do	do	July 1, 1873	July 1, 1881	do	do	600
Charles M. Irelan	Laborer	do	July 19, 1879	Oct. 16, 1880	do	do	600
Albin Schoepf*	Principal examiner	do	Mar. 14, 1866	July 1, 1870	do	Fifth	2,400
Shipley Brashears	First assistant examiner	do	Aug. 1, 1872	Jan. 1, 1878	do	do	1,800
Adolph Strecker	Clerk	Pension	June 7, 1864	July 16, 1881	do	do	1,600
Owen E. Duffy*	Second assistant examiner	Patent	Mar. 30, 1868	Mar. 13, 1873	do	do	1,600
George W. Kellogg	Clerk	Pension	Apr. 3, 1861	Aug. 1, 1879	do	do	1,600
Francis A. Smith*	do	do	July 1, 1869	July 1, 1871	do	do	1,400
John H. Larcombe	do	do	Mar. 27, 1873	Aug. 4, 1877	do	do	1,400
William S. Stewart	do	Indian	July 1, 1879	July 1, 1881	do	do	1,400
Jonathan W. Childs*	do	General Land	Aug. 5, 1879	Mar. 1, 1881	do	do	1,200
Frederick H. Taft	do	Pension	May 7, 1880	May 1, 1881	do	do	1,200

*In Army or Navy. †Colored. ‡Per day.

MARYLAND—Continued.

Name.	Grade.	Office.	Date of original appointment.	Date of present appointment.	Present legal residence.		Compensation.
					State.	Congressional district.	
Charles M. H. Phelps	Clerk	Pension	Mar. 6, 1877	Mar. 6, 1877	Maryland	Fifth	$1,200
Samuel P. Keller*	do	do	Dec. 4, 1866	Jan. 1, 1868	do	do	1,200
Miss Margaret Mercer	do	do	Apr. 1, 1879	Apr. 1, 1880	do	do	1,000
Thomas N. Young	do	do	Mar. 22, 1871	July 1, 1879	do	do	1,000
Heber Todd	do	Secretary's	Nov. 15, 1879	Feb. 1, 1881	do	do	1,000
Nimrod W. Bond	Attendant model room	Patent	Sept. 1, 1867	July 1, 1881	do	do	1,000
William H. Harrist	Clerk	Pension	Aug. 2, 1878	Aug. 2, 1878	do	do	1,000
Joseph C. Wildman	do	Patent	Mar. 17, 1868	Mar. 1, 1881	do	do	1,000
Charles Reed	do	Pension	May 15, 1879	May 1, 1881	do	do	1,200
Augustus Daily†	Fireman	Secretary's	July 1, 1875	July 1, 1878	do	do	720
William T. Baldwin	Messenger	Patent	July 8, 1874	July 1, 1881	do	do	720
Philip T. Beall	Fireman	Secretary's	May 1, 1875	July 1, 1879	do	do	720
Edmund B. Carr	do	do	July 14, 1875	July 1, 1878	do	do	720
William Boswell	Watchman	Pension	July 1, 1878	July 1, 1879	do	do	720
John H. Mitchell	Messenger	General Land	June 5, 1880	June 5, 1880	do	do	660
Arthur Martin	Clerk	Secretary's	June 1, 1877	July 1, 1880	do	Sixth	1,400
Thomas D. Haddaway	do	Pension	May 12, 1879	May 1, 1881	do	do	1,400
Samuel S. Marr	do	General Land	Sept. 5, 1870	Mar. 1, 1881	do	do	1,400
Nelson D. Adams*	do	do	July 9, 1869	Apr. 1, 1871	do	do	1,400
Centre H. Lawrence*	do	do	Feb. 10, 1866	May 1, 1871	do	do	1,400
Edward J. Farquhar	do	Patent	Nov. 1, 1865	Aug. 1, 1869	do	do	1,200
Thomas C. Hughey	do	Pension	July 26, 1879	May 24, 1881	do	do	1,200
Andrew W. Chaney	do	do	Sept. 9, 1880	May 1, 1881	do	do	1,200
Isaac W. Moore	do	do	Apr. 7, 1881	Apr. 7, 1881	do	do	1,200
Edwin I. Shope	do	General Land	Aug. 1, 1879	Mar. 1, 1881	do	do	1,000
Miss Mary A. Lumsdon	Copyist	Patent	July 1, 1869	Jan. 1, 1877	do	do	900
Rufus King*	do	Pension	July 1, 1879	Jan. 1, 1880	do	do	900
Augustus Stabler	do	Patent	May 4, 1880	July 1, 1881	do	do	900
Miss Josephine Waring	do	General Land	Mar. 1, 1880	Mar. 1, 1880	do	do	900
Benjamin F. Snyder	do	Patent	Feb. 1, 1877	July 1, 1881	do	do	720
John E. Purdy†	Messenger	Pension	Apr. 7, 1881	Apr. 7, 1881	do	do	720
C. C. Jones	Assistant photographer	Geological Survey	July 1, 1881	July 1, 1881	do	do	720
Amos Hill†	Laborer	General Land	June 13, 1881	June 13, 1881	do	do	660
Frank Adams†	do	Indian	Apr. 17, 1879	Apr. 17, 1879	do	do	660
Miss Mary S. Quantrille	do	Patent	Dec. 1, 1880	July 5, 1881	do	do	360
Eugene N. Luber	do	do	May 2, 1881	May 2, 1881	do	do	480
Max M. Minster	do	do	July 7, 1881	July 7, 1881	do	do	480
Mrs. Abbie L. Cowman	Copyist	do	July 17, 1877	July 1, 1879	do		900

John P. Lothrop*	Examiner	Pension	Apr. 11, 1881	Apr. 11, 1881	Massachusetts	First	2,000
Francis A. Wordell*	Clerk	do	Jan. 27, 1876	May 1, 1881	do	do	1,400
Dennis V. Sullivan	do	do	Apr. 9, 1881	Apr. 9, 1881	do	do	1,400
Miss Ella C. Cushman	Copyist	Patent	July 5, 1881	July 5, 1881	do	do	720
John W. Bell*	Clerk	General Land	Aug. 1, 1879	July 16, 1881	do	Third	1,600
W. T. Van Doren, jr*	do	Pension	Jan. 27, 1871	Oct. 9, 1875	do	do	1,400
Arthur W. Crossley	Third assistant examiner	Patent	Apr. 15, 1876	Aug. 16, 1880	do	do	1,400
Anderson L. Gill*	Clerk	Pension	Apr. 8, 1881	July 16, 1881	do	do	1,200
Miss Abby A. Felch	Tracer	Patent	May 1, 1871	July 1, 1876	do	do	900
Julius Solger	Copyist	do	June 1, 1880	June 1, 1880	do	do	900
G. N. Whittington*	Clerk	General Land	Apr. 1, 1871	May 1, 1880	do	Fourth	1,800
James H. Mason	do	Pension	Nov. 1, 1878	July 1, 1879	do	do	1,200
Hamilton S. Smith†	do	do	May 14, 1881	May 14, 1881	do	do	1,000
Miss Sarah E. Tingley	Copyist	Patent	July 1, 1881	July 1, 1881	do	do	900
Miss Nellie Hamlet	do	Indian	Aug. 2, 1879	July 1, 1881	do	do	720
Mrs. Marilla Wakefield	do	do	Apr. 19, 1879	July 1, 1881	do	do	600
Miss Mary P. Brown	do	Patent	Jan. 3, 1881	July 1, 1881	do	do	600
William H. Walker*	Clerk	General Land	Jan. 6, 1875	July 1, 1879	do	Fifth	1,600
Charles H. Brainard	do	Pension	June 1, 1881	July 16, 1881	do	do	1,000
Miss H. M. Robinson	Copyist	Patent	May 7, 1878	July 1, 1881	do	do	900
Nathaniel S. Howe	Clerk	Secretary's	July 2, 1877	July 2, 1877	do	Sixth	2,000
Henry Calver	First assistant examiner	Patent	Aug. 1. 1877	Aug. 1, 1880	do	do	1,800
Clarence H. Story	Draughtsman	do	Dec. 10, 1879	Dec. 10, 1879	do	do	900
Frank L. Freeman	Principal examiner	do	Oct. 1, 1872	Sept. 1, 1875	do	Seventh	2,400
Charles H. Richardson	Third assistant examiner	do	Aug. 16, 1880	Aug. 16, 1880	do	do	1,400
Arthur T King	Clerk	Pension	Mar. 1, 1879	May 1, 1881	do	do	1,200
Miss Georgiana P. Marvine	Copyist	Census	July 14, 1880	July 14, 1880	do	do	720
Moses T. Rice	Clerk	Pension	Jan. 7, 1880	Aug. 22, 1881	do	Eighth	1,200
G. P. Marvine	Librarian	Geological Survey	July 1, 1881	July 1, 1881	do	do	720
Gustave Warnke*	Watchman	Secretary's	Jan. 1, 1880	Jan. 1, 1880	do	do	720
John D. Smith*	Clerk	Pension	Mar. 14, 1876	July 16, 1881	do	Ninth	1,800
Miss Sallie F. Patterson	Copyist	do	July 1, 1877	July 1, 1877	do	do	900
Miss Ella S. Poole	do	Patent	Feb. 1, 1878	Feb. 1, 1878	do	do	900
Charles W. Hastings*	do	Indian	Nov. 1, 1872	July 1, 1881	do	do	720
William T. Grinnell	Second assistant examiner	Patent	Apr. 20, 1872	May 1, 1881	do	Tenth	1,600
Marshall B. Cushman	do	do	July 1, 1877	July 1, 1881	do	do	1,600
William B. Greene	Clerk	Pension	Apr. 7, 1881	Apr. 7, 1881	do	do	1,400
Miss Carrie S. Catlin	do	do	Mar. 11, 1872	Mar. 1, 1875	do	do	1,200
Miss Lucia M. Delano	Copyist	Patent	Aug. 1, 1879	July 1, 1881	do	do	900
John R. Bigelow*	Clerk	Pension	June 1, 1870	May 1, 1881	do	Eleventh	1,400
John A. McKinstry	do	do	May 24, 1881	May 24, 1881	do	do	1,200
Miss Mary M. Chapin	Copyist	General Land	May 14, 1875	May 14, 1875	do	do	900

*In Army or Navy.

†Colored.

MICHIGAN.

Name.	Grade.	Office.	Date of original appointment.	Date of present appointment.	Present legal residence.		Compensation.
					State.	Congressional district.	
James Edmunds	Clerk	General Land	May 1, 1861	Apr. 5, 1871	Michigan	First	$1,600
Charles H. Pluggé	Translator	Education	Aug. 1, 1876	Aug. 1, 1876	do	do	1,600
James J. Barnes*	Clerk	General Land	July 19, 1864	July 1, 1879	do	do	1,400
George H. Gorham	do	Pension	Nov. 26, 1878	July 1, 1879	do	do	1,200
James T. Birchard	do	General Land	Sept. 18, 1862	Oct. 18, 1862	do	do	1,200
Miss Mary C. Torrey	do	do	Aug. 21, 1877	Mar. 3, 1881	do	do	1,000
Emmet P. Bunyea	Copyist	Patent	Aug. 1, 1881	Aug. 1, 1881	do	do	900
Miss Isabella Rice	do	do	Jan. 3, 1872	Jan. 2, 1876	do	do	900
Miss Manette L. Smith	do	do	June 3, 1880	June 3, 1880	do	do	720
Charles J. Kintner	Second assistant examiner	do	Sept. 21, 1878	Aug. 16, 1880	do	Second	1,600
Jacob E. Parker	Clerk	Indian	Dec. 27, 1870	July 1, 1880	do	do	1,600
John F. Miller	do	Pension	Feb. 1, 1876	May 1, 1880	do	do	1,400
Oscar M. Ball*	do	do	June 19, 1871	Nov. 1, 1871	do	do	1,400
Charles E. Mott	do	do	May 4, 1880	Aug. 23, 1881	do	do	1,200
Charles E. Lusby*	do	Patent	June 24, 1868	Mar. 1, 1877	do	do	1,200
William L. Soleau	do	Pension	July 2, 1878	May 1, 1881	do	do	1,000
Miss F. E. Wadleigh	do	do	Apr. 7, 1780	Apr. 7, 1880	do	do	1,000
Miss Helen M. Hotchkiss	do	Patent	Aug. 15, 1869	July 1, 1877	do	do	1,000
Byron L. Reed	Copyist	Pension	June 4, 1880	May 1, 1881	do	do	900
Mrs. Ann E. Gridley	Laborer	Patent	June 4, 1881	July 1, 1881	do	do	600
Miss G. Withington	Copyist	do	Feb. 1, 1876	July 12, 1877	do	Third	900
Thomas S. At Lee	Clerk	Indian	June 13, 1868	Aug. 1, 1874	do	Fourth	1,400
Calvin S. Montague*	do	Pension	May 1, 1881	May 1, 1881	do	do	1,200
Uri J. Baxter*	do	Secretary's	Apr. 1, 1867	Sept. 20, 1878	do	Fifth	2,250
Benjamin A. Harlan	Examiner	Pension	Apr. 7, 1881	Apr. 7, 1881	do	do	2,000
Malcom T. E. Chandler*	First assistant examiner	Patent	Sept. 11, 1867	Aug. 1, 1869	do	do	1,800
Frank Hodges*	Clerk	Pension	May 1, 1865	May 1, 1871	do	do	1,600
Charles J. Weston*	do	do	Apr. 7, 1881	Apr. 7, 1881	do	do	1,200
Napoleon J. Smith*	do	do	Apr. 7, 1881	Apr. 7, 1881	do	do	1,200
Samuel J. Mills*	do	Secretary's	July 18, 1877	July 18, 1877	do	do	1,200
John S. Garrison	do	Pension	Jan. 1, 1877	June 1, 1878	do	do	1,200
Almos P. Bogue*	do	Education	July 1, 1872	July 1, 1881	do	do	1,200
Mrs. Ida M. Wynne	do	Pension	May 8, 1876	Apr. 7, 1880	do	do	1,000
Mrs. Nellie Seymour	Copyist	Patent	Jan. 1, 1877	July 1, 1877	do	do	900
John H. Sumner*	do	do	July 1, 1881	July 1, 1881	do	do	900
Levi Bacon	Financial clerk	do	Nov. 25, 1875	Nov. 25, 1875	do	Sixth	2,000
William W. Kinsley	Clerk	Pension	Jan. 1, 1872	July 1, 1879	do	do	1,600
Daniel T. Pierce	do	General Land	Jan. 1, 1863	Apr. 1, 1871	do	do	1,600
Philip W. Coleman*	do	Pension	Feb. 1, 1877	May 1, 1881	do	do	1,600
Alexander Scott*	Draughtsman	Patent	July 1, 1870	July 1, 1879	do	do	1,400
Samuel S. Trowbridge	Clerk	General Land	Apr. 15, 1880	July 1, 1881	do	do	1,200

Philip Richardson	do	do	Sept. 23, 1877	July 1, 1881	do	do	1,200
Allen Goodridge	do	do	Jan. 1, 1867	Aug. 1, 1879	do	do	1,100
Mrs. Harriet E. Guest	Copyist	Patent	Sept. 19, 1881	Sept. 19, 1881	do	do	720
Mrs. Mary B. Knox	do	do	Dec. 23, 1880	Dec. 23, 1880	do	do	720
Mrs. Laura L. Rugers	Laborer	do	May 1, 1878	Oct. 1, 1880	do	do	600
Miss Cordelia L. Mowry	do	do	July 1, 1880	July 5, 1881	do	do	600
Henry Wahly*	Clerk	General Land	Jan. 16, 1871	Mar. 1, 1881	do	Seventh	1,400
Charles A. Bretow*	do	do	Aug. 1, 1879	Mar. 1, 1881	do	do	1,200
Russell E. Brown	Messenger	Pension	Sept. 21, 1878	Apr. 1, 1880	do	do	840
James R. Cook	Clerk	do	Apr. 16, 1881	Apr. 16, 1881	do	Eighth	1,800
D. Kingsley Sickles	Chief, mineral claims division	General Land	July 5, 1870	May 22, 1880	do	do	1,800
George B. Brooks	Clerk	do	Oct. 1, 1881	Oct. 1, 1881	do	do	1,800
Gideon A. Lyon*	do	Pension	Feb. 1, 1876	July 1, 1879	do	do	1,400
George D. Sidman*	do	do	June 21, 1880	May 1, 1881	do	do	1,000
Mrs. Celia E. Andrews	Copyist	Patent	Nov. 1, 1875	July 12, 1881	do	do	720
Miss Carrie L. Emmons	do	do	Nov. 1, 1875	Nov. 1, 1875	do	Ninth	900
Philetus W. Norris	Superintendent Yellowstone National Park.		July 1, 1878	July 1, 1878			1,500
J. H. Welch	Clerk	General Land	Oct. 7, 1880	Oct. 7, 1880	do		1,200

MINNESOTA.

Jacob F. Stoek	Chief of civilization division	Indian	Feb. 4, 1879	July 1, 1879	Minnesota	First	1,600
William H. Boyd	Clerk	General Land	Mar. 9, 1876	July 1, 1881	do	do	1,600
Martin C. Fosnes	do	Pension	May 11, 1877	May 1, 1881	do	do	1,400
William W. Buck*	do	do	Dec. 1, 1877	May 1, 1881	do	do	1,200
Jay F. Bancroft	do	Patent	June 20, 1881	June 20, 1881	do	do	1,000
Miss Ada Braddock	Copyist	General Land	Nov. 10, 1874	Nov. 10, 1874	do	do	900
Mrs. Lucia J. K. Clark	do	Education	Apr. 1, 1874	Apr. 1, 1874	do	do	900
Cassius M. Buck*	Attendant, model room	Patent	Sept. 2, 1872	July 1, 1881	do	do	800
James A. Ashley	First assistant examiner	do	Oct. 7, 1867	May 1, 1877	do	Second	1,800
Niel F. Graham*	Clerk	Pension	Jan. 1, 1873	Apr. 1, 1873	do	do	1,800
William W. Case*	do	do	July 1, 1871	Nov. 1, 1875	do	do	1,600
Matthew S. Heard	do	do	Mar. 13, 1879	May 1, 1881	do	do	1,400
Miss Lessie E. Webster	do	do	May 9, 1874	July 1, 1881	do	do	1,200
William N. Severance*	do	do	May 11, 1881	May 11, 1881	do	do	1,200
Miss Etta L. Layne	Copyist	Patent	Mar. 10, 1877	Mar. 10, 1877	do	do	900
Miss Mollie E. Smoot	do	do	Oct. 15, 1875	July 1, 1879	do	do	900
Christian Exel*	Clerk	Pension	July 22, 1864	May 1, 1881	do	Third	1,800
Frederick Brackett*	do	General Land	Apr. 2, 1877	Mar. 1, 1881	do	do	1,600
Max Georgii	Third assistant examiner	Patent	Aug. 16, 1880	Aug. 16, 1880	do	do	1,400
Jacob B. Bausman	Special agent	General Land	Sept. 29, 1876	Jan. 1, 1877	do	do	1,400
Henry S. Hurter*	Clerk	Pension	Apr. 7, 1881	Apr. 7, 1881	do	do	1,400
Louis D. Stone	do	do	Oct. 26, 1878	May 1, 1880	do	do	1,200
David P. Craig*	do	do	Jan. 1, 1874	July 1, 1875	do	do	1,200
Mrs. Mary J. Baxter	do	Patent	July 1, 1870	July 1, 1879	do	do	1,200
Edward F. Fuller	do	Secretary's	Sept. 25, 1877	July 1, 1880	do	do	1,200
Mrs. Mary B. Saunders	do	Pension	Oct. 22, 1875	May 1, 1881	do	do	1,000
Miss Sara L. Snell	Copyist	Patent	Dec. 1, 1875	Dec. 1, 1875	do	do	900

*In Army or Navy.

MINNESOTA—Continued.

Name.	Grade.	Office.	Date of original appointment.	Date of present appointment.	Present legal residence.		Compensation.
					State.	Congressional district.	
Charles F. Wurdemann	Watchman	Secretary's	July 1, 1879	July 1, 1879	Minnesota	Third	$720
Miss Ella C. Olberg	Laborer	Patent	July 1, 1879	July 1, 1881	do	do	600
Frederick D. Carson*	Copyist	Census	Mar. 16, 1880	Sept. 1, 1880	do	Fourth	840
John W. Jones	Clerk	General Land	Oct. 3, 1876	Oct. 3, 1876	do		1,600
MISSISSIPPI.							
Henry E. Baker†	Clerk	Patent	Jan. 16, 1870	July 1, 1881	Mississippi	First	1,200
James G. Holman	Copyist	Pension	Sept. 20, 1881	Sept. 20, 1881	do	Second	900
Hiram T. Fisher*	Clerk	Patent	Oct. 1, 1876	Feb. 15, 1877	do	Third	1,800
Albert T. Morgan*	do	Pension	Aug. 21, 1876	Aug. 21, 1876	do	Fourth	1,200
St. Clair F. Sutherland	do	Patent	July 5, 1877	July 1, 1881	do	Fifth	1,200
William H. Johnson	Watchman	Secretary's	May 9, 1881	May 9, 1881	do	do	720
Eugene B. Welborn†	Laborer	Pension	Nov. 27, 1876	Nov. 27, 1876	do	do	660
Richard H. Walker*	Clerk	do	Apr. 7, 1881	Apr. 7, 1881	do	Sixth	1,200
Nathan Picard	do	do	Apr. 9, 1881	Apr. 9, 1881	do	do	1,200
George J. Mortimer	do	do	May 24, 1881	July 16, 1881	do	do	1,000
Peter P. Bergevin*	do	General Land	Feb. 2, 1871	Aug. 1, 1879	do	do	1,000
MISSOURI.							
Stephen H. Jecko	Clerk	General Land	Aug. 8, 1879	July 1, 1881	Missouri	First	1,200
Edmund S. Woog*	Financial clerk	Indian	May 23, 1877	Sept. 1, 1881	do	Second	2,000
David L. Gitt	Chief of mail division	Pension	June 8, 1869	June 1, 1876	do	do	1,800
Edward N. Pugh*	Clerk	Indian	June 1, 1877	July 1, 1878	do	do	1,600
Albert C. Fowler	Second assistant examiner	Patent	Aug. 16, 1880	July 1, 1881	do	do	1,600
Amos B. Casselman	Clerk	Pension	Apr. 16, 1881	Apr. 16, 1881	do	do	1,200
Henry S. Childs	do	do	Aug. 22, 1871	Oct. 1, 1875	do	do	1,200
Richard Sylvester	do	General Land	July 16, 1881	July 16, 1881	do	do	1,000
Mrs. Clara G. Randall	do	Indian	Dec. 16, 1878	Feb. 1, 1881	do	do	1,000
Mrs. Mary E. Cornwell	Copyist	do	Aug. 18, 1880	Aug. 18, 1880	do	do	900
August Flynne*	do	Pension	Apr. 1, 1877	Sept 15, 1881	do	do	720
William T. Fizer†	Laborer	do	June 1, 1880	June 1, 1880	do	do	660
John O'Connell*	do	Patent	May 13, 1879	May 13, 1879	do	do	600
Francis E. Brownell*	Clerk	Pension	June 2, 1881	June 2, 1881	do	Third	1,000
Louis Bergau*	do	General Land	June 2, 1877	May 1, 1878	do	Fifth	1,200

Alexander Vangeuder	do	Pension	Nov. 1, 1871	Apr. 16, 1879	do	Sixth	1,800
Robert S. Graham*	do	General Land	Oct. 29, 1874	July 1, 1881	do	do	1,600
Mrs. Laura E. Cook	Copyist	do	June 3, 1881	June 3, 1881	do	do	900
Luther W. Hickok	Clerk	Railroads	Jan. 2, 1879	July 19, 1881	do	Seventh	1,400
George W. McKean	do	Pension	Apr. 7, 1881	Apr. 7, 1881	do	do	1,200
Horace F. Clarke	Copyist	General Land	June 6, 1881	June 6, 1881	do	do	900
George M. Holmes*	Clerk	Pension	July 1, 1869	Nov. 1, 1870	do	Eighth	1,400
Thomas J. Staley	Copyist	Indian	July 2, 1881	July 2, 1881	do	do	720
Benjamin C. Fuller*	Clerk	Pension	July 24, 1869	Feb. 1, 1877	do	Ninth	1,400
John T. Clements*	do	do	May 10, 1877	May 10, 1877	do	do	1,200
James T. Hunter	do	do	Apr. 23, 1881	Apr. 23, 1881	do	do	1,200
Miss Martha Stamper	Copyist	Patent	Nov. 17, 1879	Nov. 17, 1879	do	do	900
William T. Sullivan*	Clerk	Pension	Apr. 20, 1881	Apr. 20, 1881	do	Tenth	1,200
Philip Metzger*	do	do	July 17, 1879	May 1, 1881	do	Thirteenth	1,000
Mrs. Julia S. Marks	Copyist	General Land	Mar. 3, 1871	Mar. 3, 1871	do	do	900
Arden R. Smith	Special agent	Indian	July 7, 1880	Oct. 11, 1881			2,000

NEBRASKA.

William L. Peabody	Examiner	Pension	Apr. 7, 1881	Apr. 7, 1881	Nebraska	First	2,000
Thomas C. Tipton*	First assistant examiner	Patent	Apr. 15, 1867	Jan. 1, 1880	do	do	1,800
Walt. M. Seeley	Clerk	Pension	June 5, 1881	July 15, 1881	do	do	1,400
Miss Amelia Tyler	Third assistant examiner	Patent	Oct. 10, 1881	Oct. 10, 1881	do	do	1,400
John W. Rawlins*	Clerk	Pension	June 30, 1881	June 30, 1881	do	do	1,200
Mrs. Helen E. Gray	Copyist	General Land	Mar. 10, 1880	Mar. 10, 1880	do	do	900
Frank La Flesche	do	Indian	July 12, 1881	July 12, 1881	do	do	900
Mrs. Coila B. Ashby	do	Patent	June 14, 1880	July 1, 1881	do	do	900
J. L. McCord	Clerk	Geological Survey	July 1, 1881	July 1, 1881	do	do	720

NEVADA.

Edward A. Protois	Clerk	General Land	July 15, 1864	Jan. 1, 1877	Nevada	First	1,600
Pierce McDonald*	Watchman	Pension	Apr. 7, 1881	Apr. 1, 1881	do	do	720

NEW HAMPSHIRE.

Josiah H. Hobbs	Clerk	Pension	Mar. 1, 1863	June 17, 1881	New Hampshire	First	1,800
George F. Wingate	Second assistant examiner	Patent	Nov. 8, 1880	Oct. 10, 1881	do	do	1,600
Francis D. Hobbs*	Clerk	General Land	Dec. 9, 1870	Mar. 1, 1881	do	do	1,600
Amasa C. Paul	Third assistant examiner	Patent	Jan. 3, 1881	Jan. 3, 1881	do	do	1,400
Joseph A. Meloon	Clerk	Pension	Jan. 1, 1880	May 1, 1880	do	do	1,200
Frank J. Woodman	do	do	Oct. 15, 1879	May 1, 1881	do	do	1,200
William H. Appleton	Principal examiner	Patent	July 16, 1862	July 1, 1873	do	Second	2,400

*In Army or Navy.

NEW HAMPSHIRE—Continued.

Name.	Grade.	Office.	Date of original appointment.	Date of present appointment.	Present legal residence.		Compensation.
					State.	Congressional district.	
John Edwin Mason*	Clerk	Pension	Sept. 2, 1865	Nov. 1, 1873	New Hampshire	Second	$1,400
William B. Gove	do	do	July 1, 1863	July 16, 1881	do	do	1,200
Miss Julia S. Kelly	do	Indian	May 24, 1879	Feb. 1, 1881	do	do	1,000
Miss Mabel Hatch	do	Patent	Dec. 4, 1877	July 1, 1881	do	do	1,000
Royal Parkinson*	do	Pension	June 7, 1879	May 1, 1881	do	do	1,000
Mrs. Elizabeth P. Foster	Copyist	General Land	May 9, 1878	May 9, 1878	do	do	900
Mrs. Jennie G. Houston	do	Patent	July 10, 1877	July 10, 1877	do	do	900
Miss Sarah J. Warren	Laborer	do	Sept. 1, 1879	Mar. 1, 1881	do	do	600
Benjamin R. Catlin*	Principal examiner	do	May 2, 1871	June 1, 1876	do	Third	2,400
Myron L. Story	Clerk	Pension	Aug. 11, 1864	July 16, 1881	do	do	1,800
James L. Davenport*	do	do	Apr. 7, 1881	July 15, 1881	do	do	1,600
George H. Read	do	do	July 1, 1869	July 1, 1871	do	do	1,400
Allen B. Hayward*	do	do	May 1, 1866	Oct. 1, 1881	do	do	1,400
Thomas H. Trumbull	do	General Land	Aug. 20, 1879	July 1, 1881	do	do	1,200

NEW JERSEY.

John S. Patterson*	Clerk	Pension	Mar. 8, 1877	May 1, 1881	New Jersey	First	1,800
Josiah Shaw*	do	do	July 9, 1869	May 1, 1881	do	do	1,600
William D. Siegfried	do	do	June 2, 1881	July 28, 1881	do	do	1,000
Henry F. Bender	Copyist	do	Oct. 1, 1879	Apr. 1, 1880	do	do	900
William J. McLaughlin*	Watchman	Secretary's	May 1, 1866	May 21, 1868	do	do	720
Joseph W. Howell	Clerk	Pension	Sept. 30, 1878	May 1, 1881	do	Second	1,600
Ambrose E. Rowell	do	do	May 15, 1879	May 1, 1881	do	do	1,400
William H. H. Warman*	do	do	Jan. 20, 1876	May 1, 1881	do	do	1,400
Charles M. Tompkins	do	do	May 9, 1861	July 16, 1881	do	do	1,400
George T. Dudley*	do	do	Apr. 8, 1881	Apr. 8, 1881	do	do	1,200
George W. Stokes	do	Patent	July 1, 1872	July 1, 1875	do	do	1,200
Miss Eva B. Quinn	Copyist	do	Aug. 8, 1872	July 1, 1881	do	do	900
Joel R. Siddall*	Attendant model room	do	Aug. 14, 1866	July 1, 1878	do	do	800
Jacob R. Van Mater	Examiner	Pension	Mar. 17, 1866	June 1, 1881	do	Third	2,000
Abram P. Fardon	Clerk	do	May 12, 1877	May 1, 1881	do	do	1,400
Paul R. Van Mater	do	do	Jan. 6, 1880	May 1, 1881	do	do	1,200
Israel C. Russell	Assistant geologist	Geological Survey	June 16, 1880	July 1, 1881	do	do	1,200
John F. Collins	Clerk	Pension	May 6, 1881	May 6, 1881	do	do	1,000
Mrs. Mary E. Berry	Copyist	Patent	Sept. 8, 1870	July 1, 1881	do	do	900
George W. Taylor*	Clerk	Pension	Aug. 16, 1864	May 24, 1881	do	Fourth	1,800
Henry D. Swayze	do	do	Apr. 8, 1861	Aug. 1, 1879	do	do	1,400
Charles McCarthy	do	do	May 24, 1881	May 24, 1881	do	do	1,200

Miss Alice Würdemann	Copyist	Patent	July 1, 1873	May 1, 1876	do	Fifth	900
Arnold Hague	Geologist	Geological Survey	July 8, 1879	July 8, 1879	do	Sixth	4,000
Thomas W. Dalton*	Clerk	Pension	Aug. 16, 1866	July 14, 1881	do	do	1,600
George H. Heron*	do	do	Aug. 17, 1870	Aug. 1, 1873	do	do	1,400
James M. Bessey	do	do	Jan. 6, 1880	May 1, 1881	do	do	1,000
Miss Louise J. White	Copyist	General Land	Jan. 26, 1880	July 1, 1881	do	do	840
Clem. Robinson†	Watchman	Secretary's	Oct. 25, 1872	Oct. 25, 1872	do	do	720
Harris C. Hamlin	Clerk	Pension	Apr. 20, 1881	July 16, 1881	do	Seventh	1,600
Louise D. Carman	do	do	Mar. 10, 1879	May 1, 1881	do	do	1,200
Benjamin R. Shopp	do	do	Apr. 23, 1874	Apr. 23, 1874	do	do	1,200
Joseph P. Iddings	Assistant geologist	Geological Survey	July 1, 1880	July 1, 1880	do		1,200

NEW YORK.

Edward Renaud*	Clerk	General Land	May 8, 1878	Aug. 11, 1879	New York	First	1,200
Henry W. Vincent	do	Pension	Feb. 15, 1877	Feb. 15, 1877	do	do	1,200
Horace H. Brower*	do	do	Sept. 15, 1874	Aug. 28, 1879	do	do	1,200
A. L. Webster	Assistant topographer	Geological Survey	June 16, 1880	July 1, 1881	do	do	1,000
James Brennan*	Watchman	Secretary's	July 22, 1881	July 22, 1881	do	do	720
William D. Porter	Copyist	General Land	June 1, 1881	June 1, 1881	do	Second	900
Marcellus Gardner*	Chief of draughting division	Patent	July 1, 1867	July 1, 1881	do	Third	2,000
John Richmond*	Clerk	Pension	Aug. 3, 1866	May 1, 1881	do	do	1,600
Joseph M. Davy	do	do	Apr. 1, 1872	Mar. 12, 1877	do	do	1,200
Miss Emma B. Smith	do	do	July 17, 1875	Aug. 1, 1877	do	do	1,200
Winfield F. Works*	do	do	June 2, 1880	May 24, 1881	do	do	1,000
Miss Maria Selden	Copyist	Patent	July 1, 1873	July 1, 1873	do	do	900
John D. McChesney	Chief disbursing clerk	Geological Survey	Jan. 1, 1880	Jan. 1, 1880	do	Fourth	2,400
Edward Kent, jr	Second assistant examiner	Patent	Dec. 1, 1879	Feb. 1, 1881	do	do	1,600
Abraham Moore	Clerk	do	June 9, 1858	Oct. 1, 1880	do	Fifth	1,400
James Kearney	do	Pension	June 5, 1879	May 1, 1881	do	do	1,000
George W. Bogue*	Copyist	General Land	Apr. 8, 1881	July 16, 1881	do	do	900
John J. Beatty*	Watchman	Secretary's	Jan. 21, 1879	Jan. 21, 1879	do	do	720
Isaac Edwards Clarke*	Statistician	Education		July 1, 1881	do	Seventh	2,400
Randolph C. Hyatt	Third assistant examiner	Patent	June 4, 1880	Aug. 16, 1880	do	do	1,400
Louis Morell*	Clerk	Indian	July 25, 1877	July 1, 1880	do	do	1,400
Milton C. Dent	do	Pension	Oct. 17, 1877	May 1, 1881	do	do	1,400
Francke S. Williams	Principal examiner	Patent	Feb. 1, 1875	Nov. 16, 1880	do	Eighth	2,400
Francis Fowler	do	do	June 1, 1869	Jan. 16, 1876	do	do	2,400
William M. Thompson*	Clerk	Railroads	May 19, 1870	Oct. 23, 1880	do	do	2,000
Henry G. Burlingham*	do	Pension	Feb. 6, 1877	May 1, 1881	do	do	1,600
Edward W. Cady	Third assistant examiner	Patent	July 1, 1875	July 1, 1875	do	do	1,400
Frederick Power	Clerk	Pension	May 18, 1881	May 18, 1881	do	do	1,200
Frank M. Nesmith	do	Secretary's	Jan. 12, 1881	Jan. 12, 1881	do	do	1,200
Samuel A. Safford*	do	Pension	May 3, 1876	Apr. 1, 1880	do	do	1,000
John H. Batchelor	do	do	Dec. 3, 1878	May 1, 1881	do	do	1,000
Miss Julia Henderson	Copyist	Indian	Aug. 1, 1879	Aug. 1, 1880	do	do	900
Mrs. Catherine E. Lloyd	do	Patent	July 1, 1869	July 1, 1869	do	do	900
Anthony Mason†	Messenger	Geological Survey	July 8, 1879	Feb. 1, 1880	do	do	840

*In Army or Navy. †Colored.

NEW YORK—Continued.

Name.	Grade.	Office.	Date of original appointment.	Date of present appointment.	Present legal residence.		Compensation.
					State.	Congressional district.	
David A. McKnight*	Clerk	Pension	Dec. 10, 1878	May 24, 1881	New York	Ninth	$1,600
Frederick W. Bogen*	do	do	June 20, 1869	Aug. 15, 1871	do	do	1,400
Miss Sarah P. Rossiter	Copyist	Patent	July 1, 1872	July 1, 1881	do	do	900
Miss A. L. Williamson	do	Pension	May 16, 1881	May 16, 1881	do	do	720
Samuel B. Roane*	First assistant examiner	Patent	May 17, 1869	July 1, 1881	do	Tenth	1,800
John H. Patrick*	Clerk	Pension	Apr. 25, 1861	Dec. 21, 1864	do	do	1,800
John H. Eils*	do	do	May 24, 1881	May 24, 1881	do	do	1,000
William Looram	Messenger	do	May 6, 1880	July 18, 1881	do	do	720
George L. J. Johnstone	Clerk	do	Apr. 14, 1881	Apr. 14, 1881	do	Eleventh	1,200
Frank C. Loveland	do	do	Oct. 10, 1881	Oct. 10, 1881	do	do	1,200
Joseph E. Jacobs	do	do	May 5, 1881	May 5, 1881	do	do	1,000
William R. Davis, jr†	do	do	May 6, 1881	May 6, 1881	do	do	1,000
Mrs. Marie D. Lawrence	Copyist	Patent	July 16, 1879	Sept. 1, 1881	do	do	900
Albert G. Hall	do	General Land	Feb. 27, 1880	Feb. 27, 1880	do	do	900
Edwin B. H. Tower	do	Pension	May 16, 1881	May 16, 1881	do	do	900
Wesley Thomas†	Watchman	Secretary's	Apr. 1, 1877	Feb. 17, 1881	do	do	720
James A. Hunt*	Clerk	Pension	June 2, 1881	June 2, 1881	do	Twelfth	1,200
Gabriel V. N. Ogden	do	General Land	Aug. 5, 1879	Mar. 1, 1881	do	do	1,200
Herbert R. C. Shaw	do	Pension	Mar. 1, 1877	July 14, 1881	do	do	1,000
Miss Alice E. Meikleham	do	Patent	Nov. 15, 1875	July 1, 1877	do	do	1,000
Mrs. Rebecca F. Foot	Copyist	Education	Jan. 1, 1876	Jan. 1, 1876	do	do	900
Mrs. Mary J. Hedges	do	Patent	Feb. 14, 1881	July 7, 1881	do	do	720
Mrs. Laura E. Morse	do	do	Sept. 1, 1875	July 1, 1879	do	do	720
Morris Ketcham	Clerk	Pension	Aug. 1, 1870	May 1, 1881	do	Thirteenth	1,800
Duncan Thompson	do	Secretary's	Apr. 1, 1871	July 1, 1873	do	do	1,400
Miss Nellie F. Shedd	Stenographer	Patent	July 16, 1869	Apr. 20, 1881	do	do	1,200
Benj. M. Van Keuren*	Clerk	Pension	Jan. 25, 1875	June 25, 1878	do	do	1,200
Cornelius Bortle	do	do	Apr. 1, 1871	Apr. 1, 1876	do	do	1,200
Charles H. Gage	do	do	Apr. 7, 1881	Apr. 7, 1881	do	do	1,200
Frederick W. Mitchell*	do	do	June 2, 1881	June 2, 1881	do	do	1,000
Mrs. Emma E. Pearce	do	General Land	May 22, 1874	July 1, 1881	do	do	1,000
Germond Crandell	do	Patent	June 3, 1880	July 1, 1881	do	do	1,000
Mrs. Augusta Rainals	Copyist	do	July 1, 1871	July 1, 1871	do	do	900
Miss Mary H. Downing	do	Pension	Sept. 12, 1881	Sept. 12, 1881	do	do	900
Miss Mary Flagler	do	do	May 6, 1880	May 6, 1880	do	do	900
Thomas Hampson	Statistician	Education	July 1, 1875	July 1, 1881	do	Fourteenth	1,600
Mrs. Kate Mullaly	Copyist	Pension	Sept. 4, 1879	May 1, 1881	do	do	900
Edward M. Bentley	Second assistant examiner	Patent	Aug. 17, 1880	July 1, 1881	do	Fifteenth	1,600
Raymond L. Ford*	Clerk	Pension	Apr. 6, 1877	July 1, 1879	do	do	1,600
John C. Pennie	Third assistant examiner	Patent	Feb. 1, 1881	May 1, 1881	do	Sixteenth	1,400
Henry F. Wilckens*	Clerk	General Land	July 16, 1872	May 1, 1877	do	do	1,200

John H. Hickcox, jr	do	do	Oct. 1, 1879	Mar. 1, 1881	do	do	1,200
Miss G. F. McNary	Copyist	do	Jan. 23, 1880	July 1, 1881	do	do	900
William Hanna	Clerk	Pension	Apr. 28, 1871	Nov. 1, 1875	do	Seventeenth	1,600
Mrs. Hattie K. Walsh	do	General Land	July 1, 1876	Oct. 1, 1877	do	do	1,200
James E. Curran*	do	Pension	Apr. 8, 1881	Apr. 8, 1881	do	do	1,200
John J. Carroll*	do	do	Dec. 4, 1868	Jan. 9, 1877	do	do	1,200
Walter P. Jones	do	General Land	Jan. 1, 1880	July 1, 1881	do	do	1,200
William H. Howe	Copyist	Pension	June 1, 1880	June 1, 1881	do	do	900
Miss Anna M. Fenton	do	Patent	Oct. 1, 1876	July 1, 1881	do	do	900
Albert C. Barnes	Clerk	General Land	June 6, 1879	July 1, 1881	do	Eighteenth	1,400
Lewis Y. Ellis	do	Indian	May 26, 1879	Feb. 1, 1881	do	do	1,400
Lyman D. Landon	do	Pension	Sept. 1, 1875	May 1, 1881	do	do	1,400
Alexander C. Bromley*	do	do	June 1, 1869	Dec. 1, 1875	do	do	1,200
Perry B. Pierce	First assistant examiner	Patent	Oct. 15, 1874	Nov. 16, 1880	do	Nineteenth	1,800
Miss Mary F. Powell	Clerk	Pension	Apr. 22, 1875	July 1, 1879	do	do	1,000
Albert S. Seely*	Messenger	Railroads	Aug. 25, 1879	Aug. 25, 1879	do	do	720
T. Louis Peissner	Copyist	General Land	Aug. 15, 1879	July 1, 1881	do	Twentieth	900
James T. Allen	Clerk	Patent	Sept. 18, 1868	Mar. 27, 1878	do	Twenty-first	1,200
John R. Coffin	do	Pension	June 26, 1880	May 1, 1881	do	do	1,200
Edward F. Waite	do	do	July 15, 1880	May 1, 1881	do	do	1,200
Frank B. Curtis	do	do	Apr. 6, 1880	May 1, 1881	do	do	1,000
Miss Emily L. Wilson	Copyist	Patent	July 16, 1879	July 1, 1881	do	do	900
Miss Alida S. York	do	do	Aug. 20, 1872	July 1, 1875	do	do	900
John M. Comstock	Chief of western division	Pension	Jan. 1, 1872	May 1, 1881	do	Twenty-second	2,000
Herbert E. Bates	Clerk	do	July 7, 1879	May 1, 1881	do	do	1,000
Josiah C. Stoddard	do	Secretary's	Oct. 21, 1880	June 1, 1881	do	Twenty-third	1,200
Charles D. Walcott	Assistant geologist	Geological Survey	July 17, 1879	July 1, 1880	do	do	1,200
Charles H. Sewell*	Clerk	Pension	Dec. 20, 1876	Dec. 20, 1876	do	do	1,200
Miss Sophia P. Parsons	do	Patent	July 8, 1875	July 1, 1877	do	do	1,000
Frank Bell*†	Messenger	General Land	Sept. 8, 1871	July 1, 1881	do	do	900
DeWitt P. Cowl*	Chief of application division	Patent	Aug. 25, 1867	Oct. 1, 1880	do	Twenty-fourth	1,800
William F. Eaton*	Clerk	Pension	June 15, 1869	Aug. 1, 1873	do	do	1,400
Fred. M. Barrow	do	do	Jan. 7, 1880	May 1, 1881	do	do	1,000
J. Edward Ferguson	Copyist	Secretary's	May 10, 1880	July 1, 1881	do	do	900
Mrs. Carrie C. Wright	do	Patent	July 1, 1871	Mar. 16, 1877	do	do	900
Mrs. M. Veitenheimer	do	do	Oct. 16, 1876	July 1, 1881	do	do	720
Solon W. Stocking*	Principal examiner	do	July 9, 1873	May 1, 1876	do	Twenty-fifth	2,400
Oscar C. Fox*	do	do	May 23, 1870	July 1, 1873	do	do	2,400
Melvin D. Peck*	First assistant examiner	do	Nov. 1, 1875	Feb. 10, 1877	do	do	1,800
Aretas M. Legg*	Clerk	Pension	Dec. 1, 1876	May 1, 1881	do	do	1,600
Daniel J. Kelly	Third assistant examiner	Patent	Aug. 16, 1880	Aug. 16, 1880	do	do	1,400
Wesley D. Smith	Clerk	General Land	June 16, 1870	Jan. 1, 1876	do	do	1,400
Eugene E. Fuller*	do	Pension	May 8, 1871	May 8, 1871	do	do	1,200
Robert E. Grant*	do	Patent	Nov. 1, 1875	Nov. 1, 1875	do	do	1,200
Mrs. Augusta F. Mead	Copyist	do	June 1, 1876	Sept. 1, 1878	do	do	900
Armigel W. Handcock*	do	do	Oct. 18, 1875	July 1, 1881	do	do	900
Henry W. Andrews	Clerk	Indian	Apr. 5, 1876	Aug. 1, 1880	do	Twenty-sixth	1,600
Charles Z. Culver	do	Secretary's	July 1, 1869	July 1, 1871	do	do	1,600
Edward M. Taber	do	Pension	Oct. 19, 1877	May 1, 1881	do	do	1,600
Harry F. Smith*	do	General Land	Jan. 14, 1865	Apr. 1, 1871	do	do	1,400

*In Army or Navy. †Colored.

NEW YORK—Continued.

Name.	Grade.	Office.	Date of original appointment.	Date of present appointment.	Present legal residence.		Compensation.
					State.	Congressional district.	
Frederick W. Crocker	Clerk	Patent	July 1, 1875	July 1, 1881	New York	Twenty-sixth	$1,200
John W. Fenton*	do	Indian	June 2, 1877	July 1, 1877	do	do	1,200
Clarence F. Barrett	do	Pension	May 15, 1879	May 15, 1879	do	do	1,000
Eugene R. Culver	Copyist	General Land	Feb. 8, 1877	Feb. 8, 1877	do	do	900
Francis K. Petty*	Laborer	Patent	July 5, 1881	July 5, 1881	do	do	480
George M. Lockwood*	Chief clerk of the department		Feb. 10, 1877	Apr. 10, 1877	do	Twenty-seventh	2,500
Palmer W. Roberts*	Chief of accounts division	Indian	Sept. 2, 1870	June 1, 1881	do	do	1,800
Orlando F. Davis*	Clerk	General Land	May 1, 1876	Jan. 1, 1880	do	do	1,400
Julius N. Granger	do	Pension	Apr. 7, 1853	Mar. 1, 1875	do	do	1,400
Charles S. Gregory	do	General Land	July 1, 1872	July 1, 1881	do	do	1,400
George F. McWhorter	do	Pension	June 4, 1881	June 4, 1881	do	do	1,200
Elnathan Meade*	do	do	Apr. 7, 1881	Apr. 7, 1881	do	do	1,200
George M. Chapman	do	do	Feb. 16, 1879	May 1, 1881	do	do	1,200
Miss Julia A. Wilbur	do	Patent	July 1, 1869	July 1, 1877	do	do	1,000
C. St. John Nichols*	do	Pension	June 2, 1881	Aug. 1, 1881	do	do	1,000
Miss Emily K. Winans	Copyist	General Land	May 15, 1878	May 15, 1878	do	do	900
Mrs. Adeline N. Chalker	do	do	Oct. 1, 1879	Oct. 1, 1879	do	do	900
Mason P. Adams	do	Pension	May 2, 1879	Oct. 1, 1881	do	do	840
Harrison Brown†	Laborer	General Land	June 12, 1869	June 12, 1869	do	do	660
Henry M. Lincoln	Messenger	Patent	Feb. 1, 1878	July 1, 1881	do	do	600
Raphael Pumpelly	Geologist	Geological Survey	July 16, 1879	July 16, 1879	do	Twenty-eighth	None.
Charles W. Davis	Clerk	Pension	Apr. 7, 1881	Apr. 7, 1881	do	do	1,200
Seth J. Seaman	do	General Land	Oct. 26, 1870	July 1, 1872	do	do	1,200
Miss Margaret Mills	Copyist	Patent	Jan. 1, 1877	Jan. 1, 1877	do	do	900
Mrs. Elise McKiggan	do	do	June 1, 1880	July 1, 1881	do	do	900
Mrs. Susan Druce	do	Pension	May 15, 1875	May 24, 1881	do	do	900
Mrs. Carrie C. Cole	do	do	May 6, 1881	May 6, 1881	do	do	720
George N. Smith*	Clerk	do	Apr. 17, 1870	Feb. 11, 1877	do	Twenty-ninth	1,600
Henry T. Hutton*	do	do	Apr. 14, 1864	Dec. 1, 1868	do	do	1,400
Harmon M. Brush	do	Indian	July 17, 1878	Feb. 1, 1881	do	do	1,400
Gilbert D. Mills	do	Pension	Mar. 1, 1877	May 1, 1881	do	do	1,400
Thomas F. Shoemaker*	do	General Land	Apr. 28, 1865	July 1, 1879	do	do	1,400
Theodore Smith*	do	Pension	May 14, 1879	May 1, 1881	do	do	1,400
Ebenezer Ellis	do	Patent	Dec. 15, 1875	Oct. 16, 1880	do	do	1,200
John C. Ward	do	Pension	Apr. 26, 1881	Apr. 26, 1881	do	do	1,000
Aaron S. Coleman	do	do	May 19, 1870	June 17, 1874	do	Thirtieth	1,400
William H. Hanford	do	General Land	Feb. 13, 1871	July 1, 1881	do	do	1,400
John S. Rich	do	Pension	June 13, 1871	Jan. 4, 1877	do	do	1,200
Alfred J. Wagstaff	do	do	May 12, 1880	May 1, 1881	do	do	1,200
Miss Jeannie P. Moore	Copyist	Patent	Jan. 1, 1877	July 1, 1881	do	do	900
Wallace A. Bartlett*	Principal examiner	do	Aug. 1, 1873	Dec. 1, 1875	do	Thirty-first	2,400

Henry P. Sanders*	do	do	May 15, 1867	May 13, 1875	do	do	2,400
Henry J. Gifford*	Clerk	Secretary's	July 3, 1877	July 1, 1880	do	do	1,800
George H. Shoulters	do	Indian	Mar. 22, 1876	Mar. 9, 1878	do	do	1,400
Frank W. Vaughn*	do	Pension	Jan. 12, 1866	Mar. 2, 1867	do	do	1,400
Mrs. Mary S. Parker	Tracer	Patent	Nov. 1, 1871	July 1, 1879	do	do	720
Mrs. Sarah B. Gunnison	Copyist	Pension	Apr. 11, 1881	Apr. 11, 1881	do	Thirty-second	900
Weston Flint	Librarian	Patent	Feb. 19, 1877	July 1, 1878	do	Thirty-third	2,000
Sardis L. Crissey*	Chief of swamp land division	General Land	Mar. 22, 1864	Dec. 1, 1878	do	do	1,800
Jesse H. Whitaker	First assistant examiner	Patent	May 1, 1878	Aug. 1, 1880	do	do	1,800
John W. Morris*	Clerk	Pension	June 15, 1869	May 24, 1881	do	do	1,800
Jefferson W. Davis*	do	do	July 28, 1866	May 1, 1881	do	do	1,800
James M. Curtis*	do	do	Sept. 6, 1870	May 1, 1881	do	do	1,800
Robert M. McKee*	do	General Land	Mar. 26, 1877	Mar. 26, 1877	do	do	1,200
Edgar L. Vincent	do	Pension	Apr. 9, 1880	May 24, 1881	do	do	1,000
Miss M. L. Fairchild	Copyist	General Land	June 16, 1881	June 16, 1881	do	do	900
Miss Ida M. O'Farrell	do	Patent	Dec. 1, 1876	Jan. 1, 1877	do	do	900
John M. Churchill	Attendant, model room	do	Dec. 1, 1877	July 1, 1878	do	do	800
Albert S. Logan	Messenger	Indian	Jan. 8, 1881	July 1, 1881	do	do	720
Clarence King	Geologist	Geological Survey	May 24, 1879	May 24, 1879	do		None.
Edward C. Manners	Clerk	do	Apr. 1, 1880	Apr. 1, 1881	do		1,500
Albert S. Gatschet	do	Census	July 14, 1880	July 14, 1880	do		1,400
William G. Gregory	do	General Land	Mar. 11, 1881	Mar. 11, 1881	do		1,200
Morris Bien	Draughtsman	Geological Survey	Oct. 19, 1879	July 1, 1881	do		720

NORTH CAROLINA.

Isaiah Fearing	Clerk	Pension	Sept. 23, 1871	Sept. 23, 1871	North Carolina	First	1,200
Walter E. Stumph	do	Secretary's	June 21, 1872	Mar. 22, 1880	do	do	1,200
William E. Dulin	do	Pension	July 5, 1871	Mar. 1, 1875	do	Second	1,600
John B Shinn	do	General Land	Aug. 1, 1879	Aug. 1, 1879	do	do	1,200
John B. Hyman†	Laborer	Pension	Aug. 8, 1876	July 1, 1879	do	do	660
Abiel W. Fisher*	Chief clerk	do	June 15, 1871	July 7, 1881	do	Third	2,000
Horace J. Gambrill*	Clerk	do	Apr. 1, 1879	May 1, 1881	do	do	1,200
Miss Lillie Johnston	Copyist	Patent	July 23, 1873	July 1, 1881	do	do	720
Benjamin S. Hedrick*	Principal examiner	do	Apr. 10, 1861	July 1, 1862	do	Fourth	2,400
Julian C. Dowell	Clerk	do	Feb. 1, 1873	July 1, 1881	do	do	1,200
Osborne Hunter, jr.*†	do	Pension	Apr. 7, 1881	Apr. 7, 1881	do	do	1,200
Mrs. Mary I. Page	Copyist	General Land	July 16, 1881	July 16, 1881	do	do	900
Samuel W. Snow*	Clerk	do	Apr. 11, 1877	Jan. 1, 1880	do	Fifth	1,400
Wilmont Leach	do	Pension	Apr. 8, 1881	Apr. 8, 1881	do	do	1,200
Charles S. Wheeler*	Copyist	Census	Aug. 20, 1880	Feb. 7, 1881	do	Sixth	900
David H. Graves	Clerk	Patent	May 1, 1878	Mar. 1, 1881	do	Eighth	1,200
Mrs. Julia C. Patton	Copyist	do	Feb. 16, 1877	June 1, 1878	do	do	900

*In Army or Navy. †Colored.

OHIO.

Name.	Grade.	Office.	Date of original appointment.	Date of present appointment.	Present legal residence.		Compensation.
					State.	Congressional district.	
William L. Aughinbaugh*	Second assistant examiner	Patent	Dec. 1, 1877	July 1, 1881	Ohio	First	$1,600
Philip H. Seymour	Clerk	General Land	Aug. 1, 1879	Mar. 3, 1881	do	do	1,400
William W. Locke*	do	Pension	June 18, 1881	June 18, 1881	do	do	1,200
Henry C. Huntemann	do	Patent	Apr. 26, 1875	Oct. 1, 1880	do	do	1,200
Joseph D. Morgan*	do	Pension	July 12, 1878	Apr. 1, 1880	do	do	1,200
Dering Fosdick	Copyist	Secretary's	Aug. 16, 1878	May 1, 1879	do	do	900
Mrs. B. McL. Probasco	do	General Land	Mar. 1, 1880	Mar. 1, 1880	do	do	900
Miss Minnie H. Cox	do	Pension	Nov. 15, 1879	Nov. 15, 1879	do	do	900
Horace Ellmaker	do	Secretary's	May 26, 1879	May 26, 1879	do	do	720
Jerome F. Dandelet*	Watchman	do	May 10, 1879	May 10, 1879	do	do	720
Mrs. Eliza M. Shaw	Copyist	Patent	July 1, 1873	July 1, 1881	do	do	720
Miss Theresa A. Jackson	Laborer	do	July 5, 1881	July 5, 1881	do	do	360
John J. Lynch	Clerk	do	Sept. 4, 1872	Dec. 1, 1880	do	Second	1,200
James Lupton*	do	do	May 14, 1869	July 1, 1881	do	do	1,200
Thomas C. Ryan	do	Pension	June 24, 1881	June 24, 1881	do	do	1,000
Miss Katie Schmidt	Copyist	Railroads	Nov. 6, 1879	Mar. 1, 1881	do	do	900
Miss Kate Scroggy	Clerk	Pension	July 1, 1875	June 1, 1878	do	Third	1,200
George W. Frost	do	do	Jan. 1, 1872	July 16, 1881	do	do	1,200
James A. Compton	do	do	Mar. 9, 1878	Mar. 9, 1878	do	do	1,200
Miss Mary E. Hartwell	do	do	May 15, 1873	Mar. 1, 1875	do	do	1,200
Joseph C. Cook*	Clerk	Pension	Apr. 28, 1881	Apr. 28, 1881	do	Third	1,200
John F. Sutherland	Watchman	Secretary's	July 18, 1878	July 18, 1878	do	do	720
Charles A. Maxwell*	Chief of lands division	Indian	Dec. 23, 1874	Mar. 1, 1880	do	Fourth	1,800
Tolbert Lanston*	Clerk	Pension	Aug. 1, 1865	July 7, 1881	do	do	1,800
Joseph C. Clements*	do	Secretary's	June 3, 1873	July 1, 1880	do	do	1,600
William H. Scudder*	do	Pension	June 21, 1880	July 16, 1881	do	do	1,400
Thomas P. Line*	do	do	May 9, 1881	May 9, 1881	do	do	1,000
Miss Lucy R. Brown	Copyist	Patent	July 1, 1879	July 1, 1879	do	do	900
Charles C. Royce*	Clerk	Census	July 14, 1880	July 14, 1880	do	Fifth	1,400
William H. Myers*	do	Patent	Dec. 1, 1879	Dec. 1, 1879	do	do	1,200
Milnor R. Sullivan	do	do	Sept. 1, 1878	July 1, 1881	do	do	1,200
Henry H. Sprague*	do	Indian	Mar. 1, 1880	July 1, 1880	do	do	1,200
Henry Stoek	do	Pension	June 1, 1872	July 1, 1879	do	Sixth	1,400
Arthur H. Brown	do	Education	Oct. 1, 1873	July 1, 1881	do	do	1,200
Mrs. Frank R. Lybrand	do	Patent	Mar. 1, 1876	July 1, 1881	do	do	1,200
Charles W. Bird	do	Pension	Apr. 16, 1881	Apr. 16, 1881	do	Seventh	1,200
Dayton Morgan*	Copyist	do	June 30, 1880	May 1, 1881	do	do	900
William Mayse*	Clerk	do	July 1, 1865	Nov. 1, 1870	do	Eighth	1,600
James F. Hood	Appointment clerk	Secretary's	Aug. 26, 1870	Mar. 23, 1880	do	Ninth	2,000
Lemuel A. Brandebury*	Clerk	Pension	Mar. 25, 1867	May 1, 1881	do	do	1,600
Paul E. Williams	do	do	Oct. 26, 1873	Aug. 1, 1877	do	do	1,600

George W. Terflinger*	Chief of files division	Indian	July 1, 1869	Feb. 1, 1881	do	do	1,600
William W. Cowling	Clerk	General Land	June 1, 1861	Oct. 9, 1877	do	do	1,400
Miss Anna T. Hopperton	do	Secretary's	Nov. 14, 1870	July 1, 1879	do	do	1,200
Asa A. Gardner*	do	Pension	June 10, 1881	June 10, 1881	do	do	1,200
Robert L. Cox	do	do	July 15, 1878	Aug. 16, 1881	do	do	1,200
Azro J. Corey*	do	do	Apr. 8, 1880	May 1, 1881	do	Eleventh	1,200
Robert H. Morton*	Draughtsman	General Land	July 11, 1870	July 1, 1881	do	Twelfth	1,600
Mrs. Martha S. Morrison	Copyist	do	Apr. 14, 1880	July 1, 1881	do	do	900
Calvin S. Mattoon	Watchman	Secretary's	May 3, 1880	May 3, 1880	do	do	720
Louis W. Sinsabaugh*	First assistant examiner	Patent	July 5, 1871	July 1, 1881	do	Thirteenth	1,800
Thomas L. Fracker	Clerk	Pension	Jan. 1, 1872	July 16, 1881	do	do	1,400
Thomas S. Hursey*	do	do	May 28, 1879	May 1, 1881	do	do	1,400
Daniel W. Atwood*†	do	do	Oct. 1, 1873	Nov. 1, 1875	do	do	1,400
Theodore F. Sargent	do	do	Feb. 18, 1863	Dec. 1, 1865	do	do	1,400
Joseph Adams*	do	do	June 1, 1881	June 1, 1881	do	do	1,000
Miss Emma Arthur	Copyist	Patent	July 1, 1877	July 1, 1881	do	do	900
Miss Fannie N. Edwards	do	do	Jan. 1, 1876	Dec. 1, 1880	do	do	900
Miss Sarah K. Fracker	do	do	Nov. 16, 1872	Jan. 1, 1876	do	do	900
Miss Virginia F. Ball	do	do	July 16, 1872	July 16, 1872	do	do	900
David Messer†	do	Pension	May 19, 1881	May 19, 1881	do	do	840
Henry Blandy	Second assistant examiner	Patent	May 12, 1871	Sept. 1, 1878	do	Fourteenth	1,600
Samuel J. Davis	Clerk	Pension	Mar. 16, 1861	Dec. 1, 1869	do	do	1,600
John W. Wheeller*	do	do	Aug. 1, 1875	May 1, 1881	do	do	1,400
William Mitchell*	do	do	June 1, 1881	June 1, 1881	do	do	1,000
Miss Anna Ellis	Copyist	Patent	Sept. 1, 1871	July 1, 1881	do	do	900
Mrs. M. E. Kaemmerer	Copyist	Education	Aug. 3, 1880	July 1, 1881	do	Fourteenth	720
Henry G. Potter*	Clerk	General Land	Nov. 1, 1872	July 1, 1881	do	Fifteenth	1,400
William G. Penney*	do	Pension	Apr. 7, 1881	Apr. 7, 1881	do	do	1,200
Nathan M. McLaughlin*	do	do	Apr. 12, 1880	Aug. 16, 1881	do	do	1,200
John L. Shaw	do	do	July 9, 1869	July 9, 1869	do	Sixteenth	1,200
Leroy R. Finney	do	do	Apr. 7, 1880	May 1, 1881	do	do	1,200
Miss Lucy E. Abbot	Copyist	Indian	Oct. 17, 1881	Oct. 17, 1881	do	do	900
Mrs. Margaret F. Gaston	do	Pension	Mar. 24, 1875	Mar. 24, 1875	do	do	900
William H. Summers*	do	do	June 1, 1874	June 1, 1881	do	do	900
Ezra L. Stevens	Chief clerk	Indian	Oct. 26, 1870	May 6, 1881	do	Seventeenth	2,000
Frank L. Campbell*	Clerk	Secretary's	June 27, 1870	Jan. 1, 1879	do	do	1,800
Charles R. Conner*	do	Pension	Apr. 20, 1866	Apr. 1, 1870	do	do	1,600
Matthew C. Baxter	do	do	Apr. 1, 1863	Mar. 1, 1876	do	do	1,600
Samuel C. Kerr*	do	do	May 14, 1881	July 16, 1881	do	do	1,400
Benjamin F. Hawkes	do	do	Nov. 1, 1878	July 1, 1879	do	do	1,200
Miss Lois Mygatt	do	Patent	Mar. 1, 1871	May 1, 1878	do	do	1,000
Mrs. S. A. M. Canfield	Copyist	Education	Jan. 1, 1876	Jan. 1, 1876	do	do	900
Lorenzo Holtzlander*	Clerk	Pension	Apr. 1, 1863	Mar. 1, 1877	do	Eighteenth	1,800
Charles A. Boynton*	do	General Land	July 1, 1872	July 1, 1881	do	do	1,600
Samuel M. Gordon*	do	Pension	June 1, 1872	May 1, 1881	do	do	1,400
Thomas J. Hudson	do	Patent	Sept. 1, 1880	July 1, 1881	do	do	1,200
William F. Ford*	do	Pension	Apr. 19, 1871	Dec. 1, 1875	do	do	1,200
William S. McCaffrey*	do	do	Apr. 9, 1880	May 1, 1881	do	do	1,200
Joseph H. Carr*	do	do	June 24, 1881	June 24, 1881	do	do	1,200
Sylvester T. F. Sterick*	Copyist	do	June 19, 1880	June 19, 1880	do	do	720

* In Army or Navy. † Colored.

OHIO—Continued.

Name.	Grade.	Office.	Date of original appointment.	Date of present appointment.	Present legal residence.		Compensation.
					State.	Congressional district.	
Hiram R. McCalmont*	Chief, special examination division	Pension	Feb. 12, 1872	Sept. 1, 1881	Ohio	Nineteenth	$2,000
Reuben S. Parks	First assistant examiner	Patent	July 15, 1872	July 1, 1881	do	do	1,800
William W. Whittlesey	Clerk	Pension	Dec. 7, 1876	July 16, 1881	do	do	1,200
William H. Chapman	do	Patent	Jan. 16, 1878	July 1, 1881	do	do	1,000
Smith B. Hall	do	Pension	May 6, 1881	May 6, 1881	do	do	1,000
William A. Orr*	Attendant, model room	Patent	Feb. 1, 1875	July 1, 1878	do	do	800
Miss Mary M. Ferry	Copyist	do	July 7, 1880	July 5, 1881	do	do	720
Mrs. Juliet C. Judd	do	do	Apr. 17, 1875	July 1, 1881	do	do	600
John P. Chapman	Principal examiner	do	June 1, 1872	Nov. 16, 1875	do	Twentieth	2,400
William H. Champion	Clerk	Secretary's	Mar. 28, 1861	July 1, 1878	do	do	1,600
Jacob J. De Lamater*	do	Pension	Apr. 17, 1875	Feb. 1, 1877	do	do	1,400
Benjamin Coleman	do	do	Sept. 6, 1881	Sept. 6, 1881	do	do	1,200
Carl Barus	Physicist	Geological Survey	July 19, 1880	July 1, 1881	do		1,200
George O'Reilly	Clerk	Pension	Oct. 4, 1881	Oct. 4, 1881	do		1,000
E. P. Kendrick	Surveyor of the Virginia military district in Ohio.		Jan. —, 1848	Jan. —, 1848	do	do	Fees.

OREGON.

Charles F. Carter	Messenger	Geological Survey	July 1, 1881	July 1, 1881	Oregon	First	240

PENNSYLVANIA.

John M. Emory*	Chief, appeal and interference records division.	Patent	Jan. 1, 1866	Mar. 1, 1870	Pennsylvania	First	1,600
J. William Colet	Clerk	Pension	Nov. 1, 1871	May 1, 1881	do	do	1,600
Robert McMorris	do	do	May 11, 1881	May 11, 1881	do	do	1,200
Mrs. Cornelia L. Moore	Copyist	Indian	July 1, 1880	Feb. 1, 1881	do	do	900
William J. Orr*	Laborer	Pension	Nov. 29, 1880	Nov. 29, 1880	do	do	660
John E. Hopper	Messenger	Census	June 7, 1880	June 7, 1880	do	do	240
Alexander Shiras*	Clerk	Education	Nov. 1, 1873	Nov. 1, 1873	do	Second	1,600
Henry E. Hindmarsh*	do	Indian	May 1, 1879	July 1, 1881	do	do	1,600
Abraham Hart*	do	Pension	Feb. 8, 1879	May 1, 1881	do	do	1,400
Arthur W. Bell	do	General Land	Aug. 1, 1879	July 1, 1881	do	do	1,400
Henry C. Darragh*	do	do	June 1, 1877	Oct. 1, 1877	do	do	1,400

Remus F. Foster	do	do	June 1, 1877	June 1, 1877	do	do	1,200
Michael E. Jenks*	do	Pension	July 5, 1872	July 5, 1872	do	do	1,200
Joseph R. Warner*	do	do	June 17, 1879	May 1, 1881	do	do	1,200
Joseph M. Wilson	do	do	July 1, 1878	July 1, 1879	do	do	1,000
Mrs. E. C. Kennedy	Copyist	Patent	Apr. 1, 1875	Mar. 1, 1877	do	do	900
Louis E. Johns*	do	Pension	Mar. 9, 1879	Mar. 9, 1879	do	do	900
Thomas J. Fitzsimmons	Watchman	do	Sept. 13, 1881	Sept. 13, 1881	do	do	720
John A. Brown*	Second assistant examiner	Patent	Mar. 1, 1872	Sept. 9, 1872	do	Third	1,600
James H. L. Eager*	Clerk	Pension	May 7, 1881	May 7, 1881	do	do	1,000
Miss Harriet Stine	Copyist	Patent	Aug. 1, 1869	Aug. 1, 1869	do	do	900
Philip Martin	Laborer	do	July 16, 1879	July 1, 1881	do	do	480
Joseph W. Jayne	Principal examiner	do	May 21, 1861	July 1, 1862	do	Fourth	2,400
Henry H. Arthur*	Clerk	Indian	June 1, 1877	Mar. 9, 1878	do	do	1,400
Joseph C. Squires*	do	Pension	May 15, 1872	Mar. 1, 1875	do	do	1,400
J. Edgar Engle*	do	do	Feb. 16, 1871	Jan. 1, 1875	do	do	1,400
Charles McCartee*	do	do	Apr. 29, 1881	Apr. 29, 1881	do	do	1,200
P. Filbert Nagle	Draughtsman	Patent	July 27, 1877	July 1, 1879	do	do	1,200
Walter J. Brooks	Clerk	Pension	July 3, 1879	June 1, 1881	do	do	1,000
Morris Curry	Watchman	do	Sept. 12, 1881	Sept. 12, 1881	do	do	720
Dominic I. Murphy	Clerk	do	Mar. 13, 1871	July 16, 1881	do	Fifth	1,600
William P. Seville*	do	do	Mar. 16, 1871	May 1, 1881	do	do	1,600
William W. Burke*	do	General Land	July 1, 1872	Apr. 1, 1875	do	do	1,400
Lawrence B. Hoff	do	Pension	June 22, 1880	May 1, 1881	do	do	1,200
Rudolph B. Schwickardi*	do	do	July 17, 1878	May 1, 1881	do	do	1,200
Miss Sarah A. Buckman	do	General Land	May 1, 1879	July 1, 1881	do	do	1,000
Charles F. McGill	do	Pension	Feb. 1, 1879	May 24, 1880	do	do	1,000
James McElwee*	Copyist	Patent	Mar. 1, 1870	July 1, 1877	do	do	900
Philip G. Hopkins*	do	do	Feb. 9, 1877	July 1, 1881	do	do	900
J. Green Moore	Laborer	do	Sept. 17, 1880	July 6, 1881	do	do	600
Daniel Birtwell	Clerk	Pension	Aug. 26, 1870	May 1, 1881	do	Sixth	1,800
John H. Baker*	do	General Land	May 6, 1871	July 1, 1881	do	do	1,600
Benjamin F. Crawshaw	do	Pension	June 2, 1881	June 2, 1881	do	do	1,000
Mrs. Amelia J. Rowland	Copyist	do	Apr. 9, 1881	Apr. 9, 1881	do	do	900
Miss Irene L. Williams	do	Indian	May 1, 1881	July 1, 1881	do	do	600
Mrs. Sarah V. Rotenbury	Laborer	Patent	July 5, 1881	July 5, 1881	do	do	480
Henry H. Hough*	Clerk	Pension	Apr. 6, 1881	Apr. 6, 1881	do	Seventh	1,200
Miss Dora B. Newton	Copyist	Patent	Aug. 1, 1870	Jan. 1, 1876	do	do	900
Walter J. Hoffman	Clerk	Census	July 15, 1880	July 15, 1880	do	Eighth	1,400
Henry Filler*	Captain of the watch	Secretary's	Apr. 7, 1869	May 1, 1880	do	do	1,000
Edwin H. Harner*	Messenger	Pension	Apr. 7, 1881	Apr. 7, 1881	do	do	720
Rufus A. Morrison	Third assistant examiner	Patent	Aug. 5, 1878	July 1, 1881	do	Ninth	1,400
Walter F. Rogers	do	do	July 5, 1881	July 5, 1881	do	do	1,400
Henry A. Wind	Clerk	General Land	Jan. 20, 1864	Mar. 1, 1881	do	do	1,400
David Roth	do	Pension	Nov. 1, 1870	July 1, 1879	do	do	1,400
Miss L. D. Lamparter	do	do	Mar. 28, 1879	May 1, 1881	do	do	1,000
Edward L. Rosse	Copyist	Patent	July 6, 1881	July 6, 1881	do	do	720
Nathaniel E. Robinson	Clerk	Pension	Aug. 6, 1878	May 1, 1880	do	Tenth	1,200
Byron Southwick	do	do	Apr. 9, 1881	Apr. 9, 1881	do	do	1,000
John R. Randall	do	General Land	Aug. 1, 1879	July 1, 1881	do	Twelfth	1,600
Mrs. B. S. MacDonald	Copyist	Patent	July 16, 1872	Oct. 11, 1876	do	do	900

* In Army or Navy. † Colored.

PENNSYLVANIA—Continued.

Name.	Grade.	Office.	Date of original appointment.	Date of present appointment.	Present legal residence.		Compensation.
					State.	Congresssional district.	
Jere. B. Wilbur*	Messenger	Pension	Jan. 1, 1867	May 1, 1881	Pennsylvania	Twelfth	$840
George H. Shires	Copyist	do	June 28, 1880	June 28, 1880	do	do	720
Edward H. Leib*	Clerk	do	July 23, 1879	Sept. 1, 1881	do	Thirteenth	1,000
David I. Williams	do	do	July 7, 1879	May 1, 1881	do	do	1,000
David C. Reinohl*	First assistant examiner	Patent	Jan. 17, 1873	Nov. 16, 1880	do	Fourteenth	1,800
Thomas D. Yeager*	Clerk	Pension	Aug. 1, 1871	Aug. 1, 1877	do	do	1,800
William L. Cooke	do	do	Apr. 27, 1871	July 16, 1881	do	do	1,000
Mrs. Caroline Fahnestock	Copyist	Patent	Nov. 10, 1879	Nov. 10, 1879	do	do	900
Miss Anna M. Shine	Laborer	do	July 6, 1881	July 6, 1881	do	do	360
Franklin A. Seely*	Principal examiner	do	Dec. 1, 1875	June 17, 1880	do	Fifteenth	2,400
William C. Behrens	do	do	July 1, 1877	Aug. 1, 1880	do	do	2,400
George D. Seely	Second assistant examiner	do	July 1, 1877	Mar. 15, 1879	do	do	1,600
David W. Scott	Clerk	General Land	Sept. 13, 1879	Mar. 3, 1881	do	do	1,200
Miss Lilian Burritt	Copyist	do	Aug. 1, 1879	Mar. 1, 1880	do	do	900
Alanson T. Kinney*	Clerk	Pension	Apr. 7, 1881	Apr. 7, 1881	do	Sixteenth	1,600
Frank Bell*	do	General Land	Mar. 9, 1877	Aug. 1, 1879	do	do	1,400
Mrs. F. A. McKinney	Copyist	Pension	Dec. 21, 1872	June 1, 1878	do	do	900
Franklin B. Stewart*	Clerk	do	Apr. 7, 1881	Apr. 7, 1881	do	Seventeenth	1,200
Samuel P. Pearson*	do	do	Oct. 15, 1879	May 1, 1881	do	do	1,000
Jacob R. Biddle	Copyist	General Land	July 1, 1881	July 1, 1881	do	do	720
Miss Mattie P. Walker	Laborer	Patent	Apr. 1, 1881	July 5, 1881	do	do	600
Clay McCauley	Clerk	Census	July 14, 1880	July 14, 1880	do	Eighteenth	1,200
Thomas M. Baldwin*	do	General Land	Aug. 1, 1879	July 1, 1881	do	do	1,200
Wentz C. Miller*	Copyist	do	July 20, 1881	July 20, 1881	do	do	900
James P. Kegerreis*	Messenger	Pension	June 1, 1870	June 1, 1874	do	do	840
Miss Kate V. Hayes	Laborer	Patent	Apr. 24, 1880	Oct. 16, 1880	do	do	600
John D. Hyer	First assistant examiner	do	Dec. 5, 1870	July 10, 1877	do	Nineteenth	1,800
David Kohr	Clerk	General Land	Apr. 3, 1871	Oct. 1, 1877	do	do	1,600
Robert H. Read	Third assistant examiner	Patent	July 2, 1881	July 2, 1881	do	do	1,400
Edward W. B. Phillips*	Clerk	do	Dec. 1, 1866	Nov. 1, 1870	do	do	1,400
Jeremiah W. Sterner*	do	do	Oct. 14, 1879	Oct. 14, 1879	do	do	1,200
Charles A. Erney	Draughtsman	do	July 1, 1875	July 1, 1875	do	do	1,000
Charles H. Paige	Clerk	Pension	July 7, 1879	May 1, 1881	do	do	1,000
Fleming R. Griffith	do	General Land	May 30, 1865	Mar. 1, 1868	do	Twentieth	1,400
Roland C. Cheesman*	do	Pension	May 5, 1881	May 5, 1881	do	do	1,200
William F. Shugert	do	Patent	Dec. 1, 1867	Dec. 1, 1867	do	do	1,200
Leonard B. Cook	Messenger	Secretary's	Sept. 25, 1877	June 16, 1880	do	do	720
Henry Blackstone	Engineer	Railroads	Feb. 1, 1881	Feb. 1, 1881	do	Twenty-first	2,500
James G. Johnston	Clerk	General Land	Apr. 30, 1879	July 1, 1881	do	do	1,600
John B. Lauffer	do	do	July 1, 1875	July 1, 1881	do	do	1,400
Thomas Hoge*	do	Patent	Dec. 1, 1879	July 1, 1881	do	do	1,200

James J. Purman*	do	Pension	Aug. 5, 1881	Aug. 5, 1881	do	do	1,200
Mrs. Eliza J. Smith	Copyist	Indian	Apr. 1, 1876	Apr. 1, 1876	do	do	900
Ethelbert P. Oliphant	do	General Land	Nov. 1, 1878	Nov. 1, 1878	do	do	900
Edward H. Minor*	Packer	do	Mar. 7, 1865	July 1, 1881	do	do	840
Darwin S. Wolcott	Second assistant examiner	Patent	Feb. 1, 1878	Dec. 16, 1880	do	Twenty-second	1,600
Frank A. Speare	Clerk	do	June 14, 1866	July 14, 1877	do	do	1,200
Samuel E. Marshall*	do	Indian	Feb. 14, 1881	July 1, 1881	do	do	1,009
Miss Mary J. Stoner	Laborer	Patent	July 6, 1877	May 10, 1878	do	do	600
Wilson N. Paxton*	Examiner	Pension	Apr. 7, 1881	Apr. 7, 1881	do	Twenty-third	2,000
Henry S. Stotler*	Clerk	do	Sept. 22, 1864	Nov. 1, 1875	do	do	1,600
Charles T. Yoder*	do	General Land	Aug. 7, 1879	July 1, 1881	do	do	1,400
Grenville Lewis*	do	Patent	Feb. 21, 1877	Feb. 21, 1877	do	do	1,200
George J. Bond*	do	Pension	Apr. 10, 1880	Apr. 10, 1880	do	do	1,200
William C. Hull	do	do	Apr. 7, 1881	July 16, 1881	do	do	1,200
John A. Scott*†	Messenger	do	Sept. 19, 1869	May 1, 1880	do	do	840
George Ewing	Chief of pension division	Secretary's	Mar. 28, 1863	Dec. 1, 1876	do	Twenty-fourth	2,000
Richard E. Roberts	Clerk	Pension	Apr. 7, 1881	Apr. 7, 1881	do	do	1,200
Henry A. Myers*	do	General Land	May 4, 1869	Aug. 8, 1879	do	do	1,200
Miss Ruth E. Pomeroy	Copyist	Patent	Aug. 15, 1872	July 1, 1879	do	do	900
Miss Mary S. Lyon	do	do	June 8, 1880	July 1, 1881	do	do	900
Albert G. Henry	Clerk	Pension	Apr. 7, 1881	Apr. 7, 1881	do	Twenty-fifth	1,600
Lewis C. White*	do	do	July 5, 1866	Aug. 1, 1881	do	Twenty-sixth	1,600
Lewis Thompson	Copyist	Patent	Nov. 13, 1877	July 1, 1881	do	do	900
William H. Greer	Messenger	Pension	Apr. 7, 1881	Apr. 7, 1881	do	do	720
Charles M. Bryant	Clerk	do	Apr. 4, 1876	May 1, 1881	do	Twenty-seventh	1,600
James F. Miller*	do	do	May 15, 1871	May 1, 1881	do	do	1,400
Henry W. Babbitt	do	General Land	Mar. 1, 1863	Nov. 1, 1878	do	do	1,200
Simon P. Kepler	Copyist	Pension	May 18, 1880	May 1, 1881	do	do	900
Henry Rogers*	Clerk	do	May 12, 1879	May 1, 1881	do	Twenty-ninth	1,400
William H. Moor*	Laborer	General Land	Mar. 20, 1873	Mar. 20, 1873	do	do	660
Andrew A. Blair	Special agent	Census	Sept. 9, 1879	Sept. 9, 1879	do		None.
Henry Bower	do	do	May 24, 1880	May 24, 1880	do		None.
James M. Swank	do	do	June 1, 1879	June 1, 1879	do		‡6
Curtis Cheyney	Watchman	Pension	Sept. 12, 1881	Sept. 12, 1881	do		720

RHODE ISLAND.

George W. Hall	Clerk	Pension	May 1, 1864	May 1, 1881	Rhode Island	First	1,800
Frank H. Sprague*	do	do	Feb. 15, 1872	Mar. 1, 1875	do	do	1,600
Walter E. Gardiner	do	do	Dec. 4, 1868	July 15, 1881	do	do	1,400
Charles E. Smith	Copyist	Census	Oct. 20, 1879	July 1, 1880	do	do	900
Miss Medora Fuller	do	Pension	Mar. 7, 1881	May 24, 1881	do	do	900
Miss Lila R. Munro	do	do	Apr. 7, 1879	Apr. 7, 1879	do	do	900
James W. Kensett	do	Census	Mar. 2, 1880	Mar. 2, 1880	do	do	900
William P. Dawley	do	do	Jan. 7, 1880	July 1, 1880	do	do	480
Frederic A. Holden	Clerk	General Land	Mar. 12, 1871	Dec. 1, 1875	do	Second	1,400
James Craig	Laborer	Census	Oct. 20, 1879	July 1, 1880	do	do	420
S. F. Peckham	Special agent	do	Nov. 30, 1880	Nov. 30, 1880	do		‡6

*In Army or Navy. †Colored. ‡Per day.

SOUTH CAROLINA.

Name.	Grade.	Office.	Date of original appointment.	Date of present appointment.	Present legal residence.		Compensation.
					State.	Congressional district.	
Edward F. O'Brien*	Clerk	Pension	May 12, 1877	May 12, 1877	South Carolina	Second	$1,200
John H. Jones†	Messenger	Secretary's	Jan. 4, 1871	July 1, 1878	do	do	720
Paul J. Mischeaux†	Copyist	Patent	Aug. 1, 1881	Aug. 1, 1881	do	do	720
John L. Neagle	Clerk	Pension	Apr. 7, 1881	July 28, 1881	do	Third	1,200
John L. West†	do	General Land	Aug. 5, 1879	July 1, 1881	do	do	1,200
Leonidas A. Lewis†	do	Pension	Feb. 1, 1877	May 1, 1881	do	Fourth	1,000
Joseph M. Young†	Messenger	do	Jan. 15, 1877	Jan. 15, 1877	do	do	720
Paul Brodie*	Clerk	do	Oct. 1, 1874	May 1, 1881	do	Fifth	1,800

TENNESSEE.

Robert Mason	Principal examiner	Patent	Jan. 6, 1868	July 1, 1881	Tennessee	First	2,400
Henderson Presnell	Clerk	Education	June 1, 1881	July 1, 1881	do	do	1,200
Thomas H. Mitchell	do	Patent	Apr. 18, 1881	July 1, 1881	do	do	1,000
Francis P. Bishop*	do	Pension	Apr. 15, 1881	July 16, 1881	do	do	1,000
Peter H. Grisham*	Copyist	do	June 25, 1879	Jan. 1, 1880	do	do	900
Jeffrey C. O'Connell	Clerk	do	Mar. 1, 1866	Nov. 1, 1875	do	Second	1,600
William C. Shelley	do	do	Apr. 21, 1881	Apr. 21, 1881	do	do	1,400
John C. Houk	do	do	Apr. 20, 1881	Apr. 20, 1881	do	do	1,200
Julius P. Knabe	Copyist	General Land	Aug. 7, 1879	July 1, 1881	do	do	840
Miss Mary B. Moon	do	do	Nov. 3, 1876	Nov. 3, 1876	do	Third	900
Ralph Wormley*†	Laborer	Pension	Apr. 7, 1881	Apr. 7, 1881	do	do	660
Miss Nellie D. Tannehill	Copyist	Patent	Aug. 11, 1875	Aug. 11, 1875	do	Sixth	900
Mrs. A. P. Bryant	do	Education	Sept. 15, 1879	July 1, 1881	do	do	900
Miss Mary M. Campbell	do	General Land	July 25, 1879	July 25, 1879	do	Eighth	900
Warren F. Travis	Laborer	Patent	Mar. 14, 1881	July 6, 1881	do	do	480
Mrs. Margaret V. Brown	Copyist	do	May 20, 1880	May 20, 1880	do	Ninth	900
John E. Carpenter*	Clerk	Pension	Aug. 2, 1871	May 1, 1881	do	Tenth	1,600
Max Sproesser	do	do	Apr. 7, 1881	Apr. 7, 1881	do	do	1,200
Louis M. Brown†	do	do	Apr. 7, 1881	Apr. 7, 1881	do	do	1,200
Miss Libbie E. Guyton	Copyist	General Land	Feb. 1, 1877	Feb. 1, 1877	do	do	900
Mrs. Lottie R. Beasley†	Laborer	Patent	July 1, 1879	Mar. 1, 1881	do	do	600
John A. Bostic†	do	Education	June 16, 1880	July 1, 1881	do	do	400
William F. Prosser	Special agent	General Land	Mar. 20, 1879	Mar. 20, 1879	do		1,200

TEXAS.

Mrs. Emily W. Neyland	Copyist	General Land	Apr. 3, 1876	Apr. 3, 1876	Texas	First	$900
Edward D. Boyd*	Principal examiner	Patent	Nov. 17, 1874	Jan. 1, 1880	do	Second	2,400
Gabriel G. Capron	Clerk	Pension	Apr. 8, 1881	July 16, 1881	do	Fourth	1,200
Angier M. Hobbs	do	General Land	Mar. 23, 1875	Jan. 1, 1879	do	Fifth	1,600
George W. Paschal*	do	Pension	Oct. 30, 1879	May 1, 1881	do	do	1,200
Alva S. Taber*	do	do	May 12, 1879	May 1, 1881	do	Sixth	1,600
Thomas Landers*	do	do	Jan. 26, 1877	July 16, 1881	do	do	1,400

VERMONT.

Henry Howes	Chief of pre-emption division	General Land	Nov. 23, 1871	July 1, 1881	Vermont	First	1,800
William M. Backus	Clerk	do	Feb. 9, 1871	July 1, 1881	do	do	1,400
Miss Lucy M. Strong	do	do	Apr. 1, 1875	Oct. 1, 1877	do	do	1,200
John E. Parker*	do	Pension	Dec. 13, 1872	Dec. 13, 1872	do	do	1,200
Charles C. Norton	do	General Land	Aug. 1, 1879	July 1, 1881	do	do	1,200
Miss C. E. Campbell	do	Patent	Jan. 1, 1872	July 1, 1881	do	do	1,000
Miss Louise P. Brown	do	Pension	Aug. 18, 1880	June 1, 1881	do	do	1,000
Miss Agnes J. Robinson	Copyist	Indian	Apr. 17, 1879	Aug. 1, 1880	do	do	900
Miss Mary E. Boardman	do	Patent	Dec. 1, 1876	July 1, 1877	do	do	900
Daniel E. Barrett*	Watchman	Pension	July 16, 1879	Sept. 13, 1881	do	do	720
Fred. Mack*	Chief of eastern division	do	May 15, 1872	May 1, 1881	do	Second	2,000
Charles G. Gould*	Second assistant examiner	Patent	Feb. 21, 1877	Sept. 1, 1878	do	do	1,600
Lyndon A. Smith	Clerk	Education	July 1, 1880	July 1, 1881	do	do	1,200
George S. Emery	do	Pension	Apr. 7, 1881	Apr. 7, 1881	do	do	1,200
Franklin S. Lamson*	do	do	Jan. 7, 1880	May 1, 1881	do	do	1,000
John P. Town	Purchasing clerk	Patent	July 1, 1875	July 1, 1875	do	do	1,000
Warren I. Collamer	First assistant examiner	do	Oct. 3, 1867	Mar. 11, 1870	do	Third	1,800
Lucius Green*	Clerk	Pension	June 9, 1864	July 1, 1879	do	do	1,600
James A. Whitcomb	do	do	May 1, 1880	May 1, 1881	do	do	1,200
Francis E. Camp	do	do	Apr. 7, 1880	May 1, 1881	do	do	1,200
Miss Elsie F. Joyner	Copyist	Patent	July 16, 1869	July 1, 1881	do	do	900
Mrs. Anna B. Newton	do	Pension	Jan. 19, 1875	Apr. 1, 1875	do	do	900
Miss A. E. Beecher	do	Patent	Feb. 8, 1870	Jan. 1, 1876	do	do	900
John O'Connell*	Laborer	do	June 6, 1878	July 1, 1879	do	do	600

VIRGINIA.

William S. Snow	Clerk	Pension	Sept. 3, 1873	May 1, 1881	Virginia	First	1,600
Samuel M. Yeatman	do	Indian	Feb. 6, 1878	Feb. 1, 1881	do	do	1,600
Patrick H. Slaughter, jr	do	Patent	Jan. 15, 1875	July 1, 1877	do	do	1,200
William W. Douglass	do	Pension	Apr. 16, 1881	July 16, 1881	do	do	1,200
Miss Lucy R. Ward	Copyist	Patent	Oct. 1, 1872	July 1, 1878	do	do	900
Miss Caroline G. Forbes	do	Education	Sept. 1, 1879	July 1, 1881	do	do	800

*In Army or Navy. †Colored.

VIRGINIA.—Continued.

Name.	Grade.	Office.	Date of original appointment.	Date of present appointment.	Present legal residence.		Compensation.
					State.	Congressional district.	
Robert P. Fletcher	Watchman	Pension	June 1, 1881	July 28, 1881	Virginia	First	$720
Mrs. F. V. Washington	Laborer	Patent	Aug. 9, 1877	Aug. 9, 1877	do	do	600
Thomas R. Young	Mail clerk	do	Sept. 12, 1867	Aug. 1, 1877	do	Second	1,400
Bartholomew J. Accinelly	Clerk	Pension	Apr. 7, 1881	Apr. 7, 1881	do	do	1,200
Richard U. Goode	Topographer	Geological Survey	July 8, 1879	July 8, 1879	do	do	1,200
James H. Clements	Clerk	Pension	May 2, 1876	May 2, 1876	do	do	1,200
Miss Sallie F. Chandler	do	do	Feb. 15, 1877	July 16, 1881	do	do	1,000
Silas S. Lincoln*	do	do	Jan. 1, 1876	Jan. 1, 1876	do	do	1,000
Miss Margarette Bingley	Copyist	Education	Jan. 3, 1879	July 1, 1880	do	do	900
George L. Pryor†	do	Pension	Apr. 14, 1881	July 16, 1881	do	do	900
Mrs. Columbia N. Payne	do	Patent	July 1, 1869	July 1, 1879	do	do	900
George A. Woolley*	Messenger	General Land	Sept. 1, 1872	Feb. 1, 1878	do	do	720
Mrs. Tallula K. Boush	Laborer	Patent	July 6, 1881	July 6, 1881	do	do	360
Frederick W. Poor*	Examiner	Pension	June 1, 1871	May 1, 1881	do	Third	2,000
Charles C. Wilson	Clerk	General Land	June 12, 1872	Mar. 1, 1881	do	do	1,400
Elliott De Jarnette	do	Pension	Apr. 21, 1881	Aug. 1, 1881	do	do	1,200
William R. Omohundro	Draughtsman	Patent	July 21, 1881	July 21, 1881	do	do	900
Miss Mary P. Harwood	Copyist	do	July 1, 1869	July 1, 1875	do	do	900
Robert Harris†	Messenger	Secretary's	July 22, 1880	July 22, 1880	do	do	720
Richard J. Jackson†	Laborer	Patent	Jan. 1, 1870	July 1, 1878	do	do	660
Orris Brown	do	do	Aug. 9, 1881	Aug. 9, 1881	do	do	360
Franklin Wood	Clerk	Pension	Jan. 26, 1875	May 1, 1881	do	Fourth	1,400
Mrs. Lucy A. Madison	Copyist	General Land	Dec. 1, 1874	Dec. 1, 1874	do	do	900
Peter K. Jones†	Watchman	Pension	Apr. 7, 1881	Apr. 7, 1881	do	do	720
L. S. Meador	Clerk	Geological Survey	July 9, 1879	July 1, 1881	do	do	720
Oliver Bagley†	Laborer	Patent	Aug. 1, 1881	Aug. 1, 1881	do	do	360
John W. Thomas†	Messenger	Pension	Jan. 25, 1875	Jan. 25, 1875	do	Fifth	720
John A. Stokes†	do	do	May 6, 1881	Aug. 2, 1881	do	Sixth	720
Philander E. Wilson	Clerk	Patent	Sept. 1, 1852	Jan. 6, 1881	do	Seventh	1,600
William H. Miller	do	Pension	Sept. 9, 1881	Sept. 9, 1881	do	do	1,200
Henry Minor†	Laborer	Patent	June 15, 1869	July 1, 1870	do	do	660
John P. Rawles*†	Messenger	Pension	Dec. 1, 1872	Jan. 16, 1880	do	do	660
Benjamin W. Pond	Principal examiner	Patent	July 17, 1873	Aug. 7, 1877	do	Eighth	2,400
Schuyler Duryee	Chief, assignment and copying div	do	Jan. 5, 1881	July 1, 1881	do	do	2,000
Eugene D. Harrington	Clerk	Pension	Aug. 3, 1878	May 1, 1881	do	do	1,600
Jacob E. De Putron*	do	do	Aug. 3, 1878	May 24, 1881	do	do	1,600
Michael Hart*	do	do	July 1, 1866	May 1, 1881	do	do	1,600
Charles H. Macauley	do	do	May 15, 1879	July 16, 1881	do	do	1,400
Erastus C. Johnston*	do	do	Apr 7, 1881	July 16, 1881	do	do	1,200
John W. de Krafft	do	General Land	June 1, 1837	Aug. 13, 1877	do	do	1,200
Howard B. Abbott	do	do	Aug. 5, 1879	July 1, 1881	do	do	1,200

Henry J. England*	do	Patent	May 8, 1876	May 1, 1878	do	do	1,200
Montford C. Stephens	do	do	Nov. 1, 1875	Nov. 1, 1875	do	do	1,200
John Dunn*	do	General Land	May 8, 1866	Oct. 24, 1876	do	do	1,200
Thomas A. Broadus	do	Pension	April 8, 1880	May 1, 1881	do	do	1,200
John P. Smart	do	do	Dec. 30, 1880	Dec. 30, 1880	do	do	1,200
Howard W. Blanchard	do	do	April 6, 1880	May 1, 1881	do	do	1,200
Matthew Trimble	do	Indian	June 10, 1881	June 10, 1881	do	do	1,200
Louis E. Payne	do	Pension	Dec. 7, 1879	May 1, 1881	do	do	1,200
Charles B. Hanford	do	do	Apr. 7, 1881	Apr. 7, 1881	do	do	1,200
Yvon Pike	do	General Land	Mar. 1, 1880	Mar. 1, 1881	do	do	1,200
Stanley I. Slack	do	Secretary's	Oct. 1, 1876	July 1, 1879	do	do	1,000
Robert R. Cooke	do	Pension	Sept. 13, 1879	May 1, 1881	do	do	1,000
Mrs. F. C. Thompson	Copyist	Patent	Sept. 1, 1869	July 1, 1881	do	do	900
Mrs. M. Throckmorton	do	Pension	Oct. 21, 1871	Oct. 21, 1871	do	do	900
J. McDonald Stewart	do	do	July 18, 1879	May 1, 1881	do	do	900
Miss Lilly D. Neumeyer	do	do	Apr. 12, 1881	Apr. 12, 1881	do	do	900
George B. Starkweather	do	Patent	Aug. 4, 1881	Aug. 4, 1881	do	do	960
Miss Mittie J. Jennings	do	do	Sept. 8, 1870	Jan. 6, 1877	do	do	900
Douglass Syphax*†	Attendant model room	do	June 15, 1869	July 1, 1881	do	do	800
Henry Williams†	Watchman	Secretary's	Dec. 29, 1876	Dec. 29, 1876	do	do	720
Harry Gray	Messenger	do	Nov. 6, 1874	July 22, 1880	do	do	720
Miss A. E. Underwood	Copyist	Patent	Aug. 1, 1875	Oct. 16, 1880	do	do	720
Miss Mary J. Shinn	do	Pension	May 27, 1881	May 27, 1881	do	do	720
Arthur St. A. Smith†	do	do	May 6, 1881	May 6, 1881	do	do	720
Conant C. Nelson*	do	do	June 16, 1880	June 16, 1880	do	do	720
Robert Merchant	Watchman	Secretary's	May 15, 1879	May 15, 1879	do	do	720
Charles W. Scipio†	Messenger	do	June 23, 1880	Mar. 8, 1881	do	do	660
Arthur Payne†	do	Patent	June 1, 1877	Oct. 5, 1880	do	do	660
William Allen†	Laborer	General Land	July 1, 1878	Jan. 1, 1879	do	do	660
Nevell S. Greenaway	Copyist	Patent	Feb, 5, 1875	July 1, 1881	do	do	600
Herbert L. Ramey	Laborer	do	Dec. 1, 1873	July 1, 1881	do	do	600
Miss Susan S. Harrison	do	do	May 21, 1880	May 21, 1880	do	do	600
Mrs. H. Shewalter†	do	do	June 15, 1869	Mar. 1, 1881	do	do	480
Robert C. Cassell	do	do	July 1, 1881	July 1, 1881	do	do	480
George T. Preston	do	do	Apr. 6, 1880	July 1, 1881	do	do	480
Harrison B. Franey†	do	do	Feb. 20, 1877	July 1, 1881	do	do	480
Millard J. Moore	do	do	Feb. 5, 1880	July 1, 1881	do	do	480
Alfred G. Campbell†	do	do	May 4, 1881	May 4, 1881	do	do	480
James R. Valk	do	do	July 22, 1881	July 22, 1881	do	do	360
Frank J. Bramhall	Clerk	Pension	June 5, 1879	June 1, 1881	do	Ninth	1,400
Charles E. Garrett*†	Watchman	Secretary's	Sept. 12, 1881	Sept. 12, 1881	do		720

WEST VIRGINIA.

Willis J. Drummond	Clerk	General Land	Apr. 1, 1871	July 1, 1881	West Virginia	First	1,600
James A. Macauley*	do	Pension	Mar. 1, 1872	May 1, 1881	do	do	1,600
Felix H. Pipes	do	do	Jan. 6, 1880	May 1, 1881	do	do	1,200
Edson C. Brace	do	Patent	Aug. 1, 1877	Aug. 1, 1877	do	do	1,200

*In Army or Navy. †Colored.

WEST VIRGINIA—Continued.

Name.	Grade.	Office.	Date of original appointment.	Date of present appointment.	Present legal residence.		Compensation.
					State.	Congressional district.	
Moses B. C. Wright*	Clerk	Pension	May 24, 1881	May 24, 1881	West Virginia	First	$1,000
Edward O. Russell	do	Secretary's	July 17, 1880	July 17, 1880	do	do	900
Samuel K. Burche	Copyist	Pension	June 17, 1880	July 1, 1880	do	do	720
George Q. Campbell	do	Patent	Apr. 12, 1880	July 1, 1881	do	do	600
Charles Davies*	Clerk	Pension	Apr. 19, 1881	Apr. 19, 1881	do	Second	1,800
George W. Watkins	do	do	Aug. 1, 1866	May 1, 1881	do	do	1,000
Miss Annie J. Shirley	do	do	June 28, 1878	Apr. 1, 1880	do	do	1,000
James I. Barrick	Copyist	do	Oct. 5, 1881	Oct. 5, 1881	do	do	900
Charles King*	do	do	July 1, 1880	Apr. 1, 1881	do	do	720
Samuel Pollock*	Messenger	Education	July 1, 1880	July 1, 1880	do	do	720
Benjamin F. Kelley*	Sup't Hot Springs, Ark		Sept. 8, 1877	Sept. 8, 1877			2,500

WISCONSIN.

T. C. Chamberlin	Assistant geologist	Geological Survey	July 1, 1881	July 1, 1881	Wisconsin	First	2,500
Phoenix Bartlett*	Clerk	Pension	Dec. 21, 1865	May 1, 1881	do	do	1,800
Edson A. Burdick*	do	do	Apr. 4, 1877	May 1, 1881	do	do	1,600
John W. Thomas*	do	do	May 31, 1881	May 31, 1881	do	do	1,200
Marshall H. Parks	do	do	May 10, 1879	May 10, 1879	do	do	1,200
Edward F. Gleason	do	do	Apr. 7, 1881	Apr. 7, 1881	do	do	1,200
John Donnell	do	do	May 15, 1872	May 15, 1872	do	do	1,200
Charles P. Jacobs	do	do	Jan. 9, 1879	Apr. 1, 1880	do	do	1,000
Francis Westby	Watchman	do	July 22, 1878	Aug. 2, 1879	do	do	720
William Burke	Principal examiner	Patent	Dec. 1, 1866	Sept. 9, 1872	do	Second	2,400
Miss Laura Harnden	Clerk	Pension	June 6, 1878	May 1, 1881	do	do	1,000
Archibald McNaught*	do	Patent	Jan. 10, 1881	July 1, 1881	do	do	1,000
William P. Atwell*	Copyist	Pension	Aug. 12, 1879	May 1, 1881	do	do	900
Charles A. Lan*g	Watchman	Secretary's	Jan. 20, 1880	Jan. 20, 1880	do	do	720
D. Gray Purman*	Second assistant examiner	Patent	July 1, 1877	July 1, 1881	do	Third	1,600
John W. Blackstone	Clerk	Pension	Apr. 30, 1881	June 14, 1881	do	do	1,400
Marshall G. Kimball	do	do	Oct. 1, 1879	May 1, 1881	do	do	1,400
William A. Muffley	do	do	May 21, 1880	May 1, 1881	do	do	1,000
Karl S. Loomis	do	do	Apr. 7, 1881	July 16, 1881	do	do	1,000
Frank MacArthur	Law librarian	Patent	July 14, 1877	Aug. 1, 1880	do	Fourth	1,800
Frank W. Pagenhoff	Clerk	General Land	Aug. 1, 1879	July 1, 1881	do	do	1,400
Mrs. Alice H. Lyman	do	Pension	Jan. 4, 1879	July 1, 1880	do	do	1,200
Thomas S. Burke*	do	do	Jan. 9, 1880	May 1, 1881	do	do	1,000
Charles Roeser	Chief of draughting division	General Land	May 12, 1866	May 1, 1877	do	Fifth	1,800

Miss Emily S. Cook	Stenographer	Indian	July 10, 1873	July 1, 1875	....do	....do	1,600
Edward D. Town*	Clerk	Pension	Dec. 17, 1878	Apr. 1, 1880	....do	....do	1,200
George White	....do	....do	Apr. 27, 1871	Apr. 1, 1880	....do	....do	1,000
Bradford Rixford	....do	....do	Sept. 2, 1861	Feb. 1, 1877	....do	Sixth	1,800
William H. Blodgett	First assistant examiner	Patent	May 1, 1871	Aug. 1, 1880	....do	....do	1,800
Leonard Martin*	Clerk	Pension	July 3, 1877	Aug. 11, 1881	....do	....do	1,600
John B. G. Baxter*	....do	....do	May 22, 1872	Apr. 1, 1873	....do	Seventh	1,800
Francis H. Allen*	....do	....do	June 23, 1876	May 1, 1881	....do	....do	1,800
Roscoe E. Redway*	....do	....do	Apr. 1, 1878	Apr. 1, 1878	....do	....do	1,400
Daniel J. Waters	....do	....do	Apr. 28, 1875	Apr. 28, 1875	....do	....do	1,200
George R. Walbridge*	....do	General Land	Apr. 1, 1875	Jan. 1, 1880	....do	Eighth	1,200
Elmer R. Reynolds*	....do	Pension	Jan. 12, 1877	Jan. 12, 1877	....do	....do	1,200
George A. Henry	....do	General Land	Nov. 17, 1878	Nov. 17, 1878	....do		1,200

DISTRICT OF COLUMBIA.

Samuel T. G. Morsell	Inspector of wood and coal		Sept. 17, 1880	Sept. 17, 1880	District of Columbia		Fees.
Ferdinand V. Haydn*	Geologist	Geological Survey	July 8, 1879	July 8, 1879	....do		4,000
James Stevenson*	Executive officer	....do	Mar. 1, 1881	Mar. 1, 1881	....do		3,000
Joseph B. Church	Examiner of interferences	Patent	Aug. 1, 1872	Jan. 1, 1880	....do		2,500
James C. Pilling	Chief clerk	Geological survey	July 1, 1881	July 1, 1881	....do		2,400
William H. Holmes	Assistant geologist	....do	Mar. 1, 1881	Mar. 1, 1881	....do		2,400
L. M. E. Cooke	Principal examiner	Patent	Sept. 15, 1872	Mar. 1, 1879	....do		2,400
Thomas Antisell*	....do	....do	June 1, 1856	May 10, 1877	....do		2,400
James E. M. Bowen	....do	....do	Oct. 1, 1868	May 1, 1875	....do		2,400
Thomas B. Hood*	Medical referee	Pension	June 1, 1871	Mar. 4, 1875	....do		2,250
Malcolm Seaton	Chief clerk	Patent	Aug. 1, 1866	July 6, 1880	....do		2,250
Chauncey Hickox*	Examiner	Pension	Sept. 26, 1865	May 1, 1881	....do		2,000
Samuel M. Wilcox	....do	....do	Apr. 11, 1881	Apr. 11, 1881	....do		2,000
Llewellyn A. Luce	Clerk	Secretary's	Oct. 16, 1879	Oct. 16, 1879	....do		2,000
Samuel W. Rittenhouse	....do	....do	July 20, 1880	July 1, 1881	....do		2,000
Richard Joseph	Disbursing clerk	....do	May 24, 1861	June 20, 1871	....do		2,000
John G. Ames	Chief of document division	....do	Nov. 1, 1873	July 1, 1880	....do		2,000
Eddy E. Townsend	Special agent	Indian	Mar. 11, 1880	Mar. 11, 1880	....do		2,000
S. Calvert Ford	Inspector of gas and meters		Aug. 19, 1874	Feb. 27, 1875	....do		2,000
Charles B. Purvis, M. D†	Surgeon-in-chief	Freedman's Hospital	Oct. 6, 1881	Oct. 6, 1881	....do		2,000
George W. Evans	Clerk	Secretary's	Apr. 16, 1864	July 1, 1873	....do		1,800
Robert Johnson	....do	....do	Jan. 18, 1861	Oct. 1, 1874	....do		1,800
Herman E. Blau	....do	....do	June 21, 1877	July 1, 1880	....do		1,800
Joseph B. Cox	Principal bookkeeper	Indian	Nov. 28, 1871	July 1, 1881	....do		1,800
John W. Le Barnes*	Clerk	General Land	Nov. 1, 1875	July 1, 1881	....do		1,800
John R. Dickinson	....do	....do	June 1, 1877	July 1, 1881	....do		1,800
Lewis B. Wynne, jr	First assistant examiner	Patent	Aug. 1, 1872	Jan. 1, 1878	....do		1,800
Sumner H. Bodfish*	Topographer	Geological Survey	July 8, 1879	July 8, 1879	....do		1,800
Lester F. Ward	Paleo-botanist	....do	July 1, 1881	July 1, 1881	....do		1,800
Clay MacCauley	Editor	....do	July 1, 1881	July 1, 1881	....do		1,800
August S. Boernstein*	Clerk	Census	Aug. 8, 1879	Apr. 7, 1880	....do		1,800
J. K. Hillers*	Photographer	Geological Survey	July 1, 1881	July 1, 1881	....do		1,800

* In Army or Navy. † Colored.

DISTRICT OF COLUMBIA—Continued.

Name.	Grade.	Office.	Date of original appointment.	Date of present appointment.	Present legal residence.		Compensation.
					State.	Congressional district.	
Franklin Moore	Chief of certificate and account division.	Pension	Aug. 18, 1862	July 1, 1867	District of Columbia		$1,800
John W. Wells	Clerk	do	May 3, 1871	81	do		1,800
Fred. M. Tryon	Second assistant examiner	Patent	May 8, 1879	Aug. 16, 1880	do		1,600
William H. Seaman	do	do	Apr. 1, 1879	Aug. 16, 1880	do		1,600
Joseph Lyons	do	do	Feb. 1, 1878	Aug. 16, 1880	do		1,600
George P. Whittlesey	do	do	Dec. 21, 1879	Aug. 16, 1880	do		1,600
Paul Arnold	do	do	Apr. 1, 1876	Oct. 10, 1881	do		1,600
S. Morris Pool	Clerk	do	Apr. 1, 1867	Feb. 1, 1873	do		1,600
Richard C. Gill*	Machinist	do	July 16, 1868	Feb. 1, 1871	do		1,600
George B. Coburn	Clerk	General Land	June 1, 1877	Mar. 1, 1881	do		1,600
Joseph Tyssowski	do	do	Aug. 3, 1881	Aug. 3, 1881	do		1,600
William T. Ford	Chief of record division	Pension	Aug. 1, 1848	July 16, 1881	do		1,600
Orrin H. Rundel	Clerk	do	June 19, 1866	Dec. 1, 1868	do		1,600
John T. Parson	do	do	Apr. 15, 1861	July 1, 1867	do		1,600
John H. Benton	do	do	Feb. 11, 1863	Aug. 1, 1881	do		1,600
Clayton E. Simms	do	Secretary's	July 8, 1879	June 1, 1881	do		1,400
William E. Nott	Librarian	do	June 1, 1875	Nov. 1, 1876	do		1,400
William E. Chaffee	Clerk	Patent	Aug. 24, 1868	Oct. 16, 1880	do		1,400
French S. Evans	do	do	May 16, 1871	Oct. 16, 1880	do		1,400
John W. Clements*	Third assistant examiner	do	June 20, 1868	July 1, 1881	do		1,400
William W. Townsend	do	do	Jan. 3, 1881	Jan. 3, 1881	do		1,400
Wallace St. C. Redman*	do	do	Sept. 11, 1878	Apr. 1, 1879	do		1,400
Charles Hadaway	Clerk	do	Aug. 1, 1857	Nov. 1, 1867	do		1,400
Daniel McMahon*	do	Pension	July 9, 1866	Dec. 1, 1869	do		1,400
Thomas J. Reed	do	do	May 12, 1879	July 16, 1881	do		1,400
Joseph A. Deeble	do	General Land	Apr. 28, 1852	Apr. 1, 1875	do		1,400
Oscar Hinrichs	do	do	Aug. 7, 1879	Mar. 3, 1881	do		1,400
William E. Moran	do	do	Aug. 9, 1869	Apr. 1, 1875	do		1,400
Nathaniel Freeman*	do	do	Mar. 18, 1871	Oct. 1, 1873	do		1,400
John W. Sanderson*	do	do	Aug. 1, 1872	Jan. 1, 1877	do		1,400
Wilton Griffin	do	do	Feb. 2, 1877	July 1, 1881	do		1,400
William Naylor	Draughtsman	do	Oct. 15, 1875	Jan. 15, 1881	do		1,400
Orlando C. Ketcham	Clerk	Census	Apr. 28, 1880	June 14, 1881	do		1,400
William R. Lapham	do	Secretary's	Aug. 15, 1879	July 1, 1880	do		1,200
Joshua B. Callahan	do	do	June 7, 1879	July 1, 1881	do		1,200
Andrew Woods	Engineer	do	Jan. 1, 1875	Feb. 1, 1877	do		1,200
Miss E. Carrie Cooke	Telegraph operator	do	July 3, 1878	July 3, 1878	do		1,200
Lewis G. Stephens	Proof-reader	do	Oct. 3, 1881	Oct. 3, 1881	do		1,200
Thomas W. Steuart*	Clerk	Patent	Feb. 5, 1872	Nov. 1, 1875	do		1,200
James W. Graham	Draughtsman	do	July 1, 1869	Feb. 15, 1877	do		1,200

George H. Evans	Clerk	do	May 1, 1878	July 1, 1881	do		1,200
Frederick R. Gantt	Draughtsman	do	July 9, 1877	July 1, 1881	do		1,200
James M. Fowler	Clerk	do	Aug. 3, 1864	Oct. 1, 1867	do		1,200
John Darby	do	do	Feb. 4, 1875	Oct. 1, 1881	do		1,200
William M. Evans	Draughtsman	do	June 18, 1872	Feb. 15, 1877	do		1,200
James H. Williams	Mechanic	do	July 1, 1877	July 1, 1881	do		1,200
Mrs. V. C. K. Neagle	Clerk	do	July 1, 1870	Oct. 1, 1877	do		1,200
Winfield S. Chase*	do	do	Sept. 16, 1873	July 1, 1875	do		1,200
Frank M. Ward	do	do	Sept. 1, 1880	July 1, 1881	do		1,200
Miss V. W. Middleton	do	do	June 15, 1872	Jan. 1, 1873	do		1,200
William Hendley*	do	do	Sept. 9, 1871	July 1, 1881	do		1,200
Winfield S. Fletcher	Special agent	General Land	Apr. 17, 1879	Apr. 17, 1879	do		1,200
John C. Van Hook	Draughtsman	do	May 10, 1878	July 1, 1881	do		1,200
Edward Freyhold	do	do	May 11, 1880	May 11, 1880	do		1,200
Clarence Key	Clerk	do	Aug. 1, 1879	Mar. 1, 1881	do		1,200
Wilson N. Fuller	do	do	Jan. 21, 1875	Mar. 1, 1876	do		1,200
Robert L. Ream*	Draughtsman	do	Mar. 1, 1871	July 1, 1871	do		1,200
John A. Hirth	Clerk	do	Oct. 1, 1866	Aug. 1, 1875	do		1,200
Andrew T. Stone	do	do	May 19, 1879	May 19, 1879	do		1,200
Thomas R. Benton	do	do	Mar. 18, 1871	Jan. 1, 1880	do		1,200
Christopher Boyle	do	do	Aug. 1, 1879	July 1, 1881	do		1,200
Daniel McCarty	do	do	Dec. 12, 1852	Sept. 1, 1880	do		1,200
Edward A. Duncan*	do	do	May 8, 1876	May 8, 1876	do		1,200
August Pohlers*	Draughtsman	do	Feb. 1, 1876	May 1, 1880	do		1,200
Frank P. McDermott	Clerk	do	Aug. 1, 1879	July 1, 1881	do		1,200
Thomas S. Bell	do	Pension	May 12, 1879	Apr. 1, 1880	do		1,200
Dabney Herndon	do	do	May 11, 1881	Aug. 1, 1881	do		1,200
Herbert H. Ray*	do	do	Jan. 15, 1880	May 1, 1881	do		1,200
Mrs. Sophie F. Kampf	do	do	June 24, 1878	May 1, 1880	do		1,200
Benjamin F. Moffett*	do	do	May 2, 1864	Jan. 1, 1868	do		1,200
Arthur Shepherd	do	do	Jan. 23, 1877	Jan. 23, 1877	do		1,200
Venerando E. King	do	do	Feb. 8, 1879	May 1, 1881	do		1,200
Fernando C. Griffin	do	do	Apr. 26, 1881	Apr. 26, 1881	do		1,200
John W. Bates	do	do	June 3, 1881	June 3, 1881	do		1,200
Walter Crook	do	do	July 8, 1873	Mar. 1, 1875	do		1,200
Robert J. Walker	do	do	Nov. 1, 1878	July 30, 1881	do		1,200
Dennis M. Kerr	do	do	May 12, 1879	Apr. 1, 1880	do		1,200
Erastus W. Finch	do	do	July 19, 1880	July 19, 1880	do		1,200
James C. McGowan	do	do	May 10, 1877	May 10, 1877	do		1,200
William P. Bacon	do	do	May 16, 1881	May 16, 1881	do		1,200
William S. Brock	do	do	Oct. 16, 1877	Oct. 16, 1877	do		1,200
John Dickerson*	Engineer	do	July 1, 1873	Jan. 1, 1876	do		1,200
Miss J. E. Grifling	Clerk	do	Nov. 1, 1870	Mar. 1, 1875	do		1,200
Gaillard Hunt	do	do	Apr. 15, 1881	Apr. 15, 1881	do		1,200
William E. Valk	do	do	Feb. 28, 1879	May 24, 1881	do		1,200
H. A. Schimmelfennig	do	do	July 11, 1878	May 1, 1880	do		1,200
Miss Annie T. Smith	do	Education	Feb. 1, 1879	July 1, 1880	do		1,200
Julius E. Rockwell	do	do	July 28, 1879	July 1, 1881	do		1,200
Charles C. Wilson	do	Geological Survey	July 8, 1879	July 1, 1880	do		1,200
Harry King	do	Census	Jan. 31, 1880	Feb. 2, 1881	do		1,200

*In Army or Navy. †Colored.

DISTRICT OF COLUMBIA—Continued.

Name.	Grade.	Office.	Date of original appointment.	Date of present appointment.	Present legal residence.		Compensation.
					State.	Congressional district.	
George H. Holtzman	Clerk	Indian	Sept. 1, 1850	July 1, 1875	District of Columbia		$1,200
Francis M. Bradley	ditto	ditto	May 18, 1881	May 18, 1881	ditto		1,200
Samuel E. Slater	ditto	ditto	Aug. 1, 1881	Aug. 1, 1881	ditto		1,200
Clarence G. Allen	ditto	Secretary's	Nov. 16, 1880	July 1, 1881	ditto		1,000
Andrew Bain	Assistant engineer	ditto	Oct. 1, 1877	July 1, 1878	ditto		1,000
William P. White	Clerk	ditto	Apr. 19, 1880	July 1, 1881	ditto		1,000
William George Hall*†	ditto	ditto	Feb. 1, 1870	July 1, 1879	ditto		1,000
Miss Ella L. Dorsey	ditto	Patent	Jan. 5, 1872	July 1, 1878	ditto		1,000
John B. Hines	ditto	ditto	May 3, 1861	Feb. 1, 1876	ditto		1,000
William A. Redmond	ditto	ditto	Apr. 17, 1872	July 1, 1881	ditto		1,000
James Lawlor*	ditto	ditto	Aug. 1, 1866	July 1, 1879	ditto		1,000
John Cullen*	Attendant model room	ditto	May 1, 1871	July 1, 1881	ditto		1,000
William T. Hutchinson	Clerk	ditto	June 1, 1867	Dec. 1, 1875	ditto		1,000
Thomas W. Hay	ditto	ditto	Sept. 1, 1872	Dec. 1, 1875	ditto		1,000
Richard Hunt	Attendant model room	ditto	May 1, 1871	July 1, 1881	ditto		1,000
George G. Browning	Clerk	ditto	Apr. 10, 1865	Nov. 30, 1875	ditto		1,000
William B. Atkinson	ditto	ditto	Dec. 15, 1874	July 1, 1881	ditto		1,000
Charles Sandford*	Attendant model room	ditto	Jan. 1, 1866	July 1, 1881	ditto		1,000
William H. Pennington	Clerk	Pension	May 6, 1881	May 6, 1881	ditto		1,000
Sidney W. Herbert*†	ditto	ditto	June 13, 1876	May 1, 1881	ditto		1,000
Robert O. Israel	ditto	ditto	Oct. 24, 1878	Apr. 1, 1879	ditto		1,000
William L. Wright	ditto	ditto	Nov. 15, 1873	May 1, 1881	ditto		1,000
Henry C. De Ahna, sr	ditto	ditto	Sept. 14, 1881	Sept. 14, 1881	ditto		1,000
Henry P. Holden	ditto	ditto	May 16, 1881	May 16, 1881	ditto		1,000
Mrs. Anna M. Cleary	ditto	ditto	Mar. 31, 1879	May 15, 1881	ditto		1,000
John M. Kavanaugh*	ditto	ditto	July 8, 1871	July 16, 1881	ditto		1,000
George T. Bassett	ditto	ditto	May 7, 1881	May 7, 1881	ditto		1,000
Carl Heintz*	ditto	ditto	May 2, 1881	May 2, 1881	ditto		1,000
James M. Torbet	ditto	ditto	June 1, 1880	May 1, 1881	ditto		1,000
Mrs. Maggie V. Benner	ditto	ditto	Aug. 2, 1878	Aug. 2, 1878	ditto		1,000
Charles E. Behle*	ditto	ditto	Jan. 5, 1880	May 1, 1881	ditto		1,000
Alvin T. Gregory	ditto	ditto	May 8, 1880	May 1, 1881	ditto		1,000
E. Douglass Webb	ditto	ditto	June 28, 1879	Aug. 20, 1881	ditto		1,000
John T. Sadler	ditto	ditto	June 2, 1879	May 1, 1881	ditto		1,000
John S. Wangh	ditto	General Land	Oct. 18, 1881	Oct. 18, 1881	ditto		1,000
Zachariah T. Eberbach	ditto	ditto	Nov. 17, 1880	July 1, 1881	ditto		1,000
Edward A. Balloch	ditto	Indian	July 10, 1880	July 1, 1881	ditto		1,000
Miss Susan A. Summy	ditto	ditto	June 22, 1878	Feb. 1, 1881	ditto		1,000
Joshua E. Entwisle	Assistant inspector gas and meters		Sept. 25, 1874	Mar. 1, 1875	ditto		1,000
Miss Anna Burgess	Copyist	Secretary's	Feb. 6, 1872	Feb. 15, 1877	ditto		900
William F. Ryan	ditto	ditto	Aug. 6, 1878	Mar. 1, 1880	ditto		900

Mrs. Mary Fuller	do	do	Apr. 15, 1874	July 1, 1881	do	900
John Long	do	do	July 1, 1871	July 1, 1878	do	900
Miss Laura C. Creaser	do	do	Nov. 22, 1873	Dec. 1, 1877	do	900
John F. Ford	do	do	Mar. 1, 1874	July 1, 1877	do	900
Jerome B. Dorman	Mechanic	do	July 1, 1873	July 1, 1878	do	900
John Smallwood†	Copyist	do	Sept. 1, 1866	July 1, 1880	do	900
Miss Anna Sterling	do	Patent	July 1, 1869	July 1, 1879	do	900
Mrs. Theodosia L. Talcott	do	do	July 1, 1869	Sept. 8, 1877	do	900
Mrs. Carrie W. Hopkins	do	do	Nov. 11, 1879	Dec. 1, 1880	do	900
Miss Delia Handy	do	do	July 1, 1873	May 1, 1878	do	900
Miss Sadie Tilley	do	do	Nov. 1, 1876	July 1, 1877	do	900
Miss Mary D. Peabody	do	do	July 1, 1869	Nov. 1, 1880	do	900
Mrs. Mary G. Mahon	do	do	Nov. 1, 1876	Nov. 1, 1876	do	900
Burrows W. King	do	do	July 16, 1872	July 1, 1881	do	900
Andrew C. Rawlings	do	do	May 16, 1872	July 1, 1881	do	900
Miss Laura O Friebus	Tracer	do	July 31, 1877	July 24, 1878	do	900
Percy E. Clarke	Copyist	do	Aug. 1, 1881	Aug. 1, 1881	do	900
Miss Mary E. Ferguson	do	do	Dec. 1, 1876	Dec. 1, 1876	do	900
Mrs. V. E. Lamborn	do	do	July 1, 1869	Dec. 1, 1876	do	900
Cornelius W. Davis†	Messenger	do	Mar. 4, 1871	Apr. 1, 1877	do	900
Mrs. Mary A. Merriam	Copyist	do	Jan. 11, 1878	May 1, 1878	do	900
Miss Augusta S. Mechlin	do	do	Aug. 10, 1877	Dec. 1, 1880	do	900
Richard J. Gallagher	Locksmith	do	July 1, 1869	July 1, 1869	do	900
William C. Callow	Copyist	Pension	June 15, 1880	May 1, 1881	do	900
George B. Hartwell	do	do	Jan. 6, 1880	July 16, 1881	do	900
Miss M. E. Saxton	do	do	Mar. 15, 1879	Mar. 15, 1879	do	900
Miss Louisa Wilson	do	do	Nov. 1, 1874	June 1, 1878	do	900
Mrs. Sidney I. Lauck	do	do	Apr. 1, 1869	Apr. 1, 1869	do	900
Alfred Warwick	do	do	Sept. 9, 1879	Jan. 1, 1880	do	900
John F. Keenan	do	do	Apr. 7, 1880	Apr. 7, 1880	do	900
James W. Donohoe	do	do	July 8, 1879	Jan. 1, 1880	do	900
William K. Butler	do	do	Apr. 9, 1880	Apr. 9, 1880	do	900
Otto G. Eckstein	do	do	Oct. 11, 1879	Aug. 5, 1881	do	900
Walter H. Klopfer	do	do	May 4, 1880	May 4, 1880	do	900
John Willans	do	do	July 8, 1879	Jan. 29, 1880	do	900
Mrs. Clara Von Entres	do	do	Oct. 1, 1880	May 1, 1881	do	900
Miss Jane Z. Gilfillan	do	do	Aug. 3, 1878	July 16, 1881	do	900
Miss Lizzie E. Brown	do	do	May 8, 1880	May 8, 1880	do	900
Mrs. L. E. Halleck	do	do	July 13, 1881	July 13, 1881	do	900
Bernard R. Hughes	do	do	July 7, 1879	May 1, 1880	do	900
William R. Bradford	do	do	Oct. 1, 1879	Apr. 1, 1880	do	900
Truman K. Church*	do	do	Aug. 7, 1880	May 1, 1881	do	900
Miss R. Cordelia Levy	do	General Land	Jan. 11, 1877	Jan. 11, 1877	do	900
Andrew J. Lamb	do	do	July 21, 1881	July 21, 1881	do	900
Benjamin T. Reilly	do	do	Aug. 15, 1833	Aug. 1, 1881	do	900
Mrs. Lou M. Mattingly	do	do	May 4, 1876	May 4, 1876	do	900
George Pulaski*	Messenger	do	Sept. 1, 1862	July 1, 1878	do	900
Miss Jennie McKeever	Copyist	do	Apr. 28, 1874	Apr. 28, 1874	do	900
Edward D. Callahan	do	do	July 20, 1881	July 20, 1881	do	900
Miss M. Frances Hood	do	do	Mar. 1, 1877	Mar. 1, 1877	do	900

*In Army or Navy. †Colored.

DISTRICT OF COLUMBIA—Continued.

Name.	Grade.	Office.	Date of original appointment.	Date of present appointment.	Present legal residence.		Compensation.
					State.	Congressional district.	
Miss Mary S. Lauck	Copyist	General Land	Mar. 1, 1871	Mar. 1, 1871	District of Columbia		$900
Robert Nelson*	do	do	Aug. 5, 1879	Jan. 1, 1881	do		900
Miss Emma B. Wilson	do	do	May 9, 1878	May 9, 1878	do		900
Michael A. Lyon	do	do	June 1, 1880	June 1, 1880	do		900
Martin Buell	do	do	July 1, 1861	Apr. 24, 1877	do		900
Miss Nannie Lowry	do	Indian	Oct. 20, 1880	July 1, 1881	do		900
James I. Christiancy*	do	do	July 1, 1880	July 1, 1880	do		900
John Irwin, jr	do	do	July 1, 1881	July 1, 1881	do		900
Hamilton S. Wallace	Clerk	Geological Survey	July 8, 1879	July 1, 1880	do		900
Joseph Jackson†	Messenger	Pension	Jan. 1, 1866	Aug. 15, 1871	do		840
Charles Syphax†	do	do	Dec. 1, 1865	July 1, 1873	do		840
Michael McNulty*	Copyist	General Land	July 22, 1866	July 1, 1881	do		840
Miss Jeannie Peyton	do	do	Nov. 13, 1879	July 1, 1881	do		840
Willis J. Smith†	Messenger	Indian	May 3, 1871	July 1, 1880	do		840
James T. Powell	Copyist	Census	Aug. 9, 1880	Feb. 7, 1881	do		800
Miss Mollie Jones	do	Education	July 15, 1879	July 1, 1881	do		800
Bernard Drew	Attendant model room	Patent	Apr. 27, 1859	July 1, 1881	do		720
Mrs. Mary P. Winslow	Copyist	Secretary's	May 16, 1880	July 1, 1880	do		720
H. St. C. Weeden	Watchman	do	July 17, 1880	July 17, 1880	do		720
Edward T. Hibbs	do	do	Oct. 19, 1874	Oct. 19, 1874	do		720
Gotleib Eisenbraun	do	do	June 16, 1880	June 16, 1880	do		720
Willis Lucas†	do	do	May 21, 1878	May 21, 1878	do		720
Daniel W. Hopkins*	do	do	Mar. 22, 1871	Mar. 22, 1871	do		720
John T. Sibley	do	do	Oct. 1, 1875	July 1, 1878	do		720
Maurice O'Brien*	do	do	Oct. 18, 1879	Oct. 18, 1879	do		720
Francis B. Conner*	do	do	Mar. 9, 1881	Mar. 9, 1881	do		720
Bartlett Thompson†	do	do	June 26, 1871	July 1, 1877	do		720
Charles E. Davis	do	do	May 19, 1881	May 19, 1881	do		720
Zacharia McElfresh	do	do	Apr. 14, 1879	Apr. 14, 1879	do		720
David Hall†	do	do	Sept. 27, 1877	Sept. 27, 1877	do		720
Henry Harvey†	do	do	Mar. 10, 1877	Sept. 8, 1880	do		720
Julius I. Gerhardt	do	do	Feb. 1, 1880	Feb. 1, 1880	do		720
Henry Kaiser	do	do	Oct. 3, 1863	Oct. 3, 1863	do		720
William F. Brown	Messenger	do	Sept. 25, 1877	Feb. 17, 1881	do		720
James Gass*	Fireman	do	Nov. 1, 1870	July 1, 1878	do		720
John E. Piggott*	do	do	Dec. 1, 1871	July 1, 1878	do		720
James Coffey	do	do	Sept. 13, 1880	Sept. 13, 1880	do		720
Pierce Lafayette†	Messenger	do	Dec. 15, 1873	July 1, 1878	do		720
Miss Ada Connolly	Copyist	Patent	July 5, 1881	July 5, 1881	do		720
John T. Johnson	do	do	Feb. 1, 1873	Oct. 16, 1880	do		720
Miss Annie A. Moreland	do	do	Dec. 1, 1875	July 1, 1881	do		720

Miss Helen N. Stoops	do	do	Oct. 1, 1870	July 1, 1879	do		720
Miss Minnie L. Barnard	do	do	Aug. 28, 1880	July 5, 1881	do		720
Miss Anna B. Schaeffer	Tracer	do	July 13, 1875	July 1, 1879	do		720
Mrs. Alice M. Scott	Copyist	do	May 7, 1878	July 1, 1881	do		720
Edward M. Gallaher	do	do	Oct. 1, 1877	July 1, 1879	do		720
Miss Mary I. Utley	Tracer	do	Dec. 16, 1880	June 23, 1881	do		720
Mrs. Cecile O. Hamill	Copyist	do	Aug. 4, 1881	Aug. 4, 1881	do		720
Ludwell Gunnell†	Messenger	do	Aug. 25, 1873	July 1, 1881	do		720
Miss Mary C. Mitchell	Copyist	Pensions	May 6, 1881	May 6, 1881	do		720
James D. Wise	do	do	July 14, 1879	July 14, 1879	do		720
Mrs. Helen M. Clinton	do	do	May 7, 1881	May 7, 1881	do		720
Hugh R. Stockman	do	do	June 21, 1880	June 21, 1880	do		720
Mrs. Anna M. Coleman	do	do	May 12, 1881	May 12, 1881	do		720
Miss Annie E. Ober	do	do	June 25, 1880	July 16, 1881	do		720
George L. Taylor	Messenger	do	Apr. 1, 1877	Apr. 1, 1877	do		720
Charles H. Shorter*†	do	do	Oct. 4, 1867	Oct. 4, 1867	do		720
John McKenney	do	do	Feb. 1, 1877	Feb. 1, 1877	do		720
Hamilcar Turley†	do	do	May 5, 1876	July 8, 1878	do		720
John Taylor*	Watchman	do	Mar. 10, 1879	July 1, 1879	do		720
Miss Mary P. Whitwell	Copyist	General Land	Aug. 8, 1881	Aug. 8, 1881	do		720
Alfred G. Holmead	do	do	June 12, 1877	June 12, 1877	do		720
George W. Clarvoe	do	do	Aug. 27, 1879	July 1, 1881	do		720
Francis J. McGraw*	Messenger	do	Aug. 5, 1879	Mar. 1, 1881	do		720
Mrs. Mary E. Draper	Copyist	Indian	June 17, 1880	July 1, 1881	do		720
Isaac H. Uncles†	Messenger	do	May 5, 1871	Oct. 1, 1876	do		720
William J. Foley	Copyist	Census	May 6, 1880	Feb. 7, 1881	do		720
Nicholas Lochboehler	do	do	July 29, 1880	Feb. 7, 1881	do		720
Charles F. Kozel	do	do	Aug. 9, 1880	Nov. 11, 1880	do		720
George L. Harrington	do	do	Apr. 15, 1879	Feb. 7, 1881	do		720
Frank Hunt	do	do	June 20, 1879	Feb. 7, 1881	do		720
William H. Goines†	Laborer	Secretary's	Nov. 1, 1879	July 1, 1881	do		660
George W. Wood†	do	do	Oct. 14, 1867	July 1, 1878	do		660
John C. Young†	do	do	Mar. 10, 1873	July 1, 1878	do		660
Joseph Jackson†	Messenger	Patent	Oct. 1, 1875	Oct. 1, 1875	do		660
Lockrum Blue†	do	do	Nov. 1, 1870	Nov. 1, 1870	do		660
James H. Payne†	do	do	Aug. 22, 1873	Aug. 22, 1873	do		660
Miss Frances Hewlett	Copyist	Pension	Sept. 1, 1881	Sept. 1, 1881	do		660
Robert Carter†	do	do	Nov. 18, 1879	Nov. 18, 1879	do		660
John Reilly	Laborer	do	Oct. 8, 1881	Oct. 8, 1881	do		660
George A. Talbot	do	do	July 29, 1880	July 29, 1880	do		660
Beverly Horton†	do	do	July 17, 1877	July 17, 1877	do		660
William Hutcherson*	do	do	Aug. 9, 1879	Aug. 9, 1879	do		660
Benjamin Tolivert†	do	do	Apr. 27, 1881	Apr. 27, 1881	do		660
Dennis Tinney†	do	do	July 1, 1878	July 1, 1878	do		660
Mrs. Fanny Jackson†	do	do	Dec. 1, 1877	Dec. 1, 1877	do		660
James E. Wells†	do	do	May 3, 1881	May 3, 1881	do		660
Abraham Hayson†	do	do	Apr. 7, 1881	Apr. 7, 1881	do		660
Clement Morgan†	do	do	Mar. 24, 1881	Mar. 24, 1881	do		660
George Webster†	do	do	Mar. 8, 1881	Mar. 8, 1881	do		660
Louis Jackson†	do	do	Nov. 1, 1872	Nov. 1, 1872	do		660

*In Army or Navy. †Colored.

DISTRICT OF COLUMBIA—Continued.

Name.	Grade.	Office.	Date of original appointment.	Date of present appointment.	Present legal residence.		Compensation.
					State.	Congressional district.	
John H. Reeves*†	Laborer	General Land	Sept. 15, 1871	Sept. 15, 1871	District of Columbia		$660
Washington Grady	do	do	Jan. 5, 1876	Jan. 5, 1876	do		660
Washington Beckett†	do	do	Jan. 6, 1880	Jan. 6, 1880	do		660
Rudolph Scheitlin	Packer	do	June 4, 1881	June 4, 1881	do		660
William R. Spencer	Messenger	do	Apr. 22, 1879	Apr. 22, 1879	do		660
Leander G. Wilson*	Laborer	do	July 23, 1881	July 23, 1881	do		660
John F. Shorter†	do	do	Jan. 21, 1875	Jan. 21, 1875	do		660
Benjamin S. Stewart†	do	do	Sept. 7, 1880	Mar. 1, 1881	do		660
Robert Diggs†	do	do	Dec. 4, 1879	Feb. 1, 1880	do		660
William Johnson†	do	do	July 1, 1880	Mar. 1, 1881	do		660
Charles Pryor†	do	Education	July 1, 1880	July 1, 1880	do		660
William H. Moffat	do	do	Jan. 1, 1879	July 1, 1881	do		660
Miss Nellie C. Crosby	Copy reader	Secretary's	Oct. 3, 1881	Oct. 3, 1881	do		600
Miss Zillah Solomons	do	do	Oct. 3, 1881	Oct. 3, 1881	do		600
Miss H. H. M. Hertzog	do	do	Oct. 3, 1881	Oct. 3, 1881	do		600
Franklin Ford†	Laborer	do	July 1, 1878	July 1, 1878	do		600
Edward E. Ellis	Copyist	Patent	Oct. 1, 1873	July 1, 1881	do		600
Charles A. Clements	do	do	Aug. 21, 1874	July 1, 1879	do		600
Willis B. Magruder	Clerk	do	Sept. 1, 1876	May 15, 1879	do		600
Robert A. Trouland	Laborer	do	Mar. 16, 1880	Nov. 1, 1880	do		600
Mrs. Mary J. Martin	do	do	Dec. 17, 1869	Oct. 16, 1880	do		600
Bunyan Olive	do	do	Sept. 1, 1873	July 1, 1881	do		600
Mrs. Mary E. Maroney	do	do	July 18, 1877	July 1, 1881	do		600
Augustus Wingate	do	do	Sept. 8, 1878	July 1, 1879	do		600
Miss Bridget A. Coleman	do	do	July 17, 1879	Nov. 1, 1880	do		600
Alexander Pope	do	do	May 1, 1878	July 1, 1881	do		600
George W. Ross	do	do	Sept. 1, 1877	July 1, 1879	do		600
Ballard N. Morris	Messenger	do	Apr. 22, 1880	July 1, 1881	do		600
Sandy Alexander†	do	do	July 21, 1871	Dec. 1, 1875	do		600
Oscar Thomas†	do	do	May 1, 1879	May 1, 1879	do		600
Mrs. Caroline C. Bowie†	do	do	Nov. 20, 1878	July 1, 1879	do		600
Joseph K. Bridge	Copyist	Indian	Oct. 17, 1881	Oct. 17, 1881	do		600
Claude F King	do	do	Nov. 2, 1877	July 1, 1881	do		600
William D. Wirt	Watchman	Geological Survey	Apr. 9, 1881	July 1, 1881	do		600
Gran Price†	do	do	Feb. 1, 1880	Feb. 1, 1880	do		600
Patrick Wheeler†	do	do	Feb. 1, 1880	Feb. 1, 1880	do		600
Jeremiah Baldwin†	Messenger	do	Jan. 16, 1880	Jan. 16, 1880	do		600
Mrs. Lucy H. Flynn	Laborer	Patent	Jan. 16, 1876	Sept. 1, 1880	do		480
George W. Emerson	do	do	May 4, 1880	May 4, 1880	do		480
Mrs. Bridget Byrne	do	do	Dec. 20, 1879	Oct. 16, 1880	do		480
Lewis Hill†	do	do	July 10, 1868	July 1, 1881	do		480

Lucius Harrod†	do	do	Jan. 1, 1880	Nov. 1, 1880	do		480
Mrs. C. S. Malone	do	do	July 1, 1879	July 1, 1879	do		480
Somerville L. Nicholson	do	do	July 16, 1879	July 1, 1881	do		480
William H. Clark†	do	do	June 1, 1865	July 1, 1881	do		480
Henry Brown†	do	do	Oct. 21, 1879	Mar. 1, 1881	do		480
Washington Jones†	do	Education	Jan. 18, 1881	July 1, 1881	do		480
James A. Matthews	Watchman	Geological Survey	July 1, 1881	July 1, 1881	do		480
Charles McC. Chapman	Messenger	Patent	Jan. 17, 1880	Dec. 1, 1880	do		360
Finis D. Morris	Laborer	do	Nov. 1, 1878	July 5, 1881	do		360
Edward A. Ellsworth	do	do	Apr. 25, 1881	Apr. 25, 1881	do		360
Milton T. Parke†	do	do	July 1, 1881	July 1, 1881	do		360
Paul D. Sullivan	do	do	Apr. 11, 1881	Apr. 11, 1881	do		360
Miss Kate Tracy	do	do	May 1, 1881	July 11, 1881	do		360
George E. Tucker	do	do	Aug. 22, 1881	Aug. 22, 1881	do		360
Mrs. L. C. White†	do	do	Mar. 1, 1881	Mar. 1, 1881	do		360
Mrs. Ellen Wilson†	do	do	July 5, 1881	July 5, 1881	do		360
George M. Copenhaver	do	do	Jan. 3, 1881	Jan. 3, 1881	do		360
Charles St. V. Zimmerman	do	do	July 5, 1881	July 5, 1881	do		360
C. Alexander Mason	do	do	Nov. 1, 1880	Nov. 1, 1880	do		360
Aloysius Griffith	do	do	Aug. 9, 1881	Aug. 9, 1881	do		360
Henry Reeves†	do	do	July 5, 1881	July 5, 1881	do		360
William Jackson†	do	Pension	Aug. 1, 1881	Aug. 1, 1881	do		300
Frederick Eckstein	Messenger	Census	Aug. 11, 1880	Aug. 11, 1880	do		300

NEW MEXICO.

Joseph Loughran	Clerk	Pension	Sept. 8, 1869	Aug. 1, 1879	New Mexico		1, 600
Anton Karl	do	General Land	July 21, 1881	July 21, 1881	do		1, 200

UTAH TERRITORY.

Grove K. Gilbert	Geologist	Geological Survey	July 8, 1879	July 8, 1879	Utah		4, 000
Gilbert Thompson	Topographer	do	May 1, 1880	May 1, 1880	do		2, 500
Miss Isabella Carter	Copyist	General Land	Oct. 9, 1878	Oct. 9, 1878	do		900
Miss Carrie Owen	do	Patent	Apr. 26, 1880	July 25, 1881	do		720

WASHINGTON TERRITORY.

Mrs. Fannie Moore	Clerk	Patent	Nov. 10, 1872	July 1, 1877	Washington Territory		1, 200

*In Army or Navy. †Colored.

RECAPITULATION.

Alabama	3
Arkansas	9
Colorado	11
California	14
Connecticut	38
Delaware	8
Florida	5
Georgia	13
Illinois	71
Indiana	33
Iowa	49
Kansas	24
Kentucky	14
Louisiana	9
Maine	36
Maryland	78
Massachusetts	42
Michigan	59
Minnesota	31
Mississippi	11
Missouri	31
Nebraska	9
Nevada	2
New Hampshire	21
New Jersey	33
New York	189
North Carolina	17
Ohio	106
Oregon	1
Pennsylvania	136
Rhode Island	11
South Carolina	8
Tennessee	23
Texas	7
Vermont	24
Virginia	88
West Virginia	15
Wisconsin	37
District of Columbia	368
New Mexico	2
Utah	4
Washington Territory	1
Total	1,691
Male	1,343
Female	348
In Army or Navy	443
Colored	113

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47TH CONGRESS, 1st Session. } SENATE. { EX. DOC. No. 6.

MESSAGE

FROM THE

PRESIDENT OF THE UNITED STATES,

TRANSMITTING,

In response to Senate resolution of May 17, 1881, *a report of the Secretary of State, with accompanying papers, touching the Geneva Convention for the relief of the wounded in war.*

DECEMBER 12, 1881.—Referred to the Committee on Foreign Relations and ordered to be printed.

To the Senate of the United States:

I transmit herewith, in response to the resolution of the Senate of the 17th of May last, a report of the Secretary of State, with accompanying papers, touching the Geneva Convention for the relief of the wounded in war.

CHESTER A. ARTHUR.

EXECUTIVE MANSION,
Washington, December 12, 1881.

To the President:

The Secretary of State, to whom was addressed a resolution of the Senate, dated the 17th of May, 1881, requesting him "to furnish to the Senate copies (translations) of Articles of Convention signed at Geneva, Switzerland, August 22, 1864, touching the treatment of those wounded in war, together with the forms of ratification employed by the several governments parties thereto," has the honor to lay before the President the papers called for by the resolution.

In view of the reference made, in Annual Message of the President, to the Geneva Convention, the Secretary of State deems it unnecessary now to enlarge upon the advisability of the adhesion of the United States to an international compact, at once so humane in its character and so universal in its application as to commend itself to the adoption of nearly all the civilized Powers.

JAMES G. BLAINE.

DEPARTMENT OF STATE,
Washington, December 10, 1881.

GENEVA CONVENTION FOR THE RELIEF OF THE WOUNDED IN WAR.

(SIGNED AUGUST 22, 1864.)

The Swiss Confederation; His Royal Highness the Grand Duke of Baden; His Majesty the King of the Belgians; His Majesty the King of Denmark; Her Majesty the Queen of Spain; His Majesty the Emperor of the French; His Royal Highness the Grand-Duke of Hesse; His Majesty the King of Italy; His Majesty the King of the Netherlands; His Majesty the King of Portugal and of the Algarves; His Majesty the King of Prussia; His Majesty the King of Würtemberg, being equally animated with the desire to soften, as much as depends on them, the evils of warfare, to suppress its useless hardships and improve the fate of wounded soldiers on the field of battle, have resolved to conclude a Convention to that effect, and have named for their Plenipotentiaries, viz:

The Swiss Confederation:

GUILLAUME HENRI DUFOUR, Grand Officer of the Imperial Order of the Legion of Honor, General in Chief of the federal army, Member of the Council of the States;

GUSTAVE MOYNIER, President of the International Relief Committee for wounded soldiers and of the Geneva Society of Public Utility, and

SAMUEL LEHMANN, federal Colonel, Doctor in Chief of the federal army, Member of the National Council;

His Royal Highness the Grand-Duke of Baden:

ROBERT VOLZ, Knight of the Order of the Lion of Zaehringen, M. D., Medical Councillor at the Direction of Medical Affairs, and

ADOLPHE STEINER, Knight of the Order of the Lion of Zaehringen, Chief Staff Physician;

His Majesty the King of the Belgians:

AUGUSTE VISSCHERS, Officer of the Order of Leopold, Councillor at the Council of Mines;

His Majesty the King of Denmark:

CHARLES EMILE FENGER, Commander of the Order of Danebrog, decorated with the silver cross of the same Order; Grand Cross of the Order of Leopold of Belgium, &c., &c., His Councillor of State;

Her Majesty the Queen of Spain:

Don JOSÉ HERIBERTO GARCÍA DE QUEVEDO, Gentleman of Her Chamber on active service, Knight of the Grand Cross of Isabella-the-Catholic, Numerary Commander of the Order of Charles III, Knight of the first class of the Royal and Military Order of St. Ferdinand, Officer of the Legion of Honor of France, Her Minister-Resident to the Swiss Confederation;

His Majesty the Emperor of the French:

GEORGES CHARLES JAGERSCHMIDT, Officer of the Imperial Order of the Legion of Honor, Officer of the Order of Leopold of Belgium, Knight of the Order of the Red Eagle of Prussia of the third class, &c., &c., Sub-Director at the Ministry of Foreign Affairs;

HENRI EUGÈNE SEGUINEAU DE PRÉVAL, Knight of the Imperial Order of the Legion of Honor, decorated with the Imperial Order of the Medjidié of fourth class, Knight of the Order of Saints Maurice and Lazarus of Italy, &c., &c., military Sub-Commissioner of first class, and

MARTIN FRANÇOIS BOUDIER, Officer of the Imperial Order of the Legion of Honor, decorated with the Imperial Order of the Medjidié of the fourth class, decorated with the medal of Military Valor of Italy, &c., &c., doctor in chief of second class;

His Royal Highness the Grand-Duke of Hesse:

CHARLES AUGUSTE BRODRÜCK, Knight of the Order of Philip the Magnanimous, of the Order of St. Michael of Bavaria, Officer of the Royal Order of the Holy Savior, &c., &c., Chief of Battalion, Staff Officer;

His Majesty the King of Italy:

JEAN CAPELLO, Knight of the Order of Saints Maurice and Lazarus, His Consul-General to Switzerland, and

FELIX BAROFFIO, Knight of the Order of Saints Maurice and Lazarus, Doctor in Chief of medical division;

His Majesty the King of the Netherlands:

BERNARD ORTUINUS THEODORE HENRI WESTENBERG, Officer of His Order of the Crown of Oak, Knight of the Orders of Charles III of Spain, of the Crown of Prussia, of Adolphe of Nassau, L. D., His Secretary of Legation at Frankfort;

His Majesty the King of Portugal and of the Algarves:

JOSÉ ANTONIO MARQUES, Knight of the Order of Christ, of Our Lady of the Conception of Villa Viciosa, of Saint Benedict of Aviz, of Leopold of Belgium, etc., M. D. Surgeon of Brigade, Sub-Chief to the Department of Health at the Ministry of War;

His Majesty the King of Prussia:

CHARLES ALBERT DE KAMPTZ, Knight of the Order of the Red Eagle of second class, &c., &c., &c., His Envoy Extraordinary and Minister Plenipotentiary to the Swiss Confederation, Private Councillor of Legation;

GODEFROI FREDERIC FRANÇOIS LOEFFLER, Knight of the Order of the Red Eagle of third class, etc., etc.; M. D. Physician in chief of the fourth Army Corps;

GORGES HERMANN JULES RITTER, Knight of the Order of the Crown of third class, etc., etc., Private Councillor at the Ministry of War;

His Majesty the King of Würtemberg:

CHRISTOPHE ULRIC HAHN, Knight of the Order of Saints Maurice and Lazarus, etc., Doctor of Philosophy and Theology, Member of the Central Royal Direction for Charitable Institutions,

Who, after having exchanged their powers, and found them in good and due form, agreed to the following articles:

ARTICLE I. Ambulances and military hospitals shall be acknowledged to be neuter, and, as such, shall be protected and respected by belligerents so long as any sick or wounded may be therein.

Such neutrality shall cease if the ambulances or hospitals should be held by a military force.

ART. II. Persons employed in hospitals and ambulances, comprising the staff for superintendence, medical service, administration, transport of wounded, as well as chaplains, shall participate in the benefit of neutrality, whilst so employed, and so long as there remain any wounded to bring in or to succour.

ART. III. The persons designated in the preceding article may, even after occupation by the enemy, continue to fulfil their duties in the hospital or ambulance which they serve, or may withdraw in order to rejoin the corps to which they belong.

Under such circumstances, when these persons shall cease from their functions, they shall be delivered by the occupying army to the outposts of the enemy.

ART. IV. As the equipment of military hospitals remains subject to the laws of war, persons attached to such hospitals cannot, in withdrawing, carry away any articles but such as are their private property.

Under the same circumstances an ambulance shall, on the contrary, retain its equipment.

ART. V. Inhabitants of the country who may bring help to the wounded shall be respected, and shall remain free. The generals of the belligerent Powers shall make it their care to inform the inhabitants of the appeal addressed to their humanity, and of the neutrality which will be the consequence of it.

Any wounded man entertained and taken care of in a house shall be considered as a protection thereto. Any inhabitant who shall have entertained wounded men in his house shall be exempted from the quartering of troops, as well as from a part of the contributions of war which may be imposed.

ART. VI. Wounded or sick soldiers shall be entertained and taken care of, to whatever nation they may belong.

Commanders-in-chief shall have the power to deliver immediately to the outposts of the enemy soldiers who have been wounded in an engagement, when circumstances permit this to be done, and with the consent of both parties.

Those who are recognized, after their wounds are healed, as incapable of serving, shall be sent back to their country.

The others may also be sent back, on condition of not again bearing arms during the continuance of the war.

Evacuations, together with the persons under whose directions they take place, shall be protected by an absolute neutrality.

ART. VII. A distinctive and uniform flag shall be adopted for hospitals, ambulances, and evacuations. It must, on every occasion, be accompanied by the national flag. An arm-badge (brassard) shall also be allowed for individuals neutralized, but the delivery thereof shall be left to military authority.

The flag and the arm-badge shall bear a red cross on a white ground.

ART. VIII. The details of execution of the present convention shall be regulated by the commanders-in-chief of belligerent armies, according to the instructions of their

respective Governments, and in conformity with the general principles laid down in this convention.

ART. IX. The high contracting Powers have agreed to communicate the present convention to those Governments which have not found it convenient to send plenipotentiaries to the International Conference at Geneva, with an invitation to accede thereto; the protocol is for that purpose left open.

ART. X. The present convention shall be ratified, and the ratifications shall be exchanged at Berne in four months, or sooner, if possible.

In faith whereof the respective Plenipotentiaries have signed it and have affixed their seals thereto.

Done at Geneva, the twenty-second day of the month of August of the year one thousand eight hundred and sixty-four.

[L. S.] G'l G. H. DUFOUR.
[L. S.] G. MOYNIER.
[L. S.] Dr. LEHMANN.
[L. S.] Dr. ROBERT VOLZ.
[L. S.] STEINER.
[L. S.] VISSCHERS.
[L. S.] FENGER.
[L. S.] Y. HERIBERTO GARCÍA DE QUEVEDO.
[L. S.] CH. JAGERSCHMIDT.
[L. S.] S. DE PRÉVAL.
[L. S.] BOUDIER.
[L. S.] BRODRÜCK.
[L. S.] CAPELLO.
[L. S.] F. BAROFFIO.
[L. S.] WESTENBERG.
[L. S.] JOSÉ ANTONIO MARQUES.
[L. S.] DE KAMPTZ.
[L. S.] LOEFFLER.
[L. S.] RITTER.
[L. S.] Dr. HAHN.

The Convention of Geneva was signed on behalf of Switzerland, Baden, Belgium, Denmark, Spain, France, Hesse-Darmstadt, Italy, Netherlands, Portugal, Prussia, and Wiirtemberg, August 22, 1864, and the following Powers have since acceded to it:

Austria, 1866; Bavaria, 1866; Great Britain, 1865; Greece, 1865; Mecklenburg-Schwerin, 1865; the Pope, 1868; Persia, 1874; Russia, 1867; Saxony, 1866; Sweden and Norway, 1864; Turkey, 1865.

ACTS OF RATIFICATION.

a. OF SWITZERLAND.

The Federal Council of the Swiss Confederation:

After having seen and examined the Convention for the improvement of the condition of wounded soldiers in armies in the field, concluded by the respective Plenipotentiaries and under reserve of ratification, at Geneva the 22d of August, 1864, between the Swiss Confederation, His Royal Highness the Grand-Duke of Baden, His Majesty the King of the Belgians, His Majesty the King of Denmark, Her Majesty the Queen of Spain, His Majesty the Emperor of the French, His Royal Highness the Grand-Duke of Hesse, His Majesty the King of Italy, His Majesty the King of the Netherlands, His Majesty the King of Portugal and of the Algarves, His Majesty the King of Prussia, and His Majesty the King of Würtemberg, which Convention has been approved by the National Council on the 28th of September, 1864, and by the Council of the States on the 30th of the same month, and the tenor whereof is as follows:

(See above.)

Declares that the above Convention is ratified and has legal power in all its parts, promising in the name of the Swiss Confederation to observe it conscientiously and at all times, inasmuch as is in its power.

In faith whereof, the present ratification has been signed by the President and the Chancellor of the Confederation and provided with the Federal Seal.

Done at Berne the first of October one thousand eight hundred and sixty-four.

In the name of the Swiss Federal Council.

The President of the Confederation:

[L. S.] DR. J. DUBS.

The Chancellor of the Confederation:

SCHIESS.

b. OF THE GRAND DUCHY OF BADEN.

FREDERIC, by the grace of God, Grand Duke of Baden, Duke of Zaehringen:

A Convention having been concluded at Geneva, the 22d of August ultimo, between the Grand Duchy of Baden and the Swiss Confederation, the Kingdom of Belgium, the Kingdom of Denmark, the Kingdom of Spain, the French Empire, the Grand Duchy of Hesse, the Kingdom of Italy, the Kingdom of the Netherlands, the Kingdom of Portugal, the Kingdom of Prussia, and the Kingdom of Würtemberg, for the amelioration of the condition of the wounded in armies in the field, the tenor of which Convention is as follows:

(See above.)

We having seen and examined the said Convention and having found its tenor conformable to Our will in all and each of the dispositions in it contained, Declare that it is approved, confirmed, and ratified, reserving, however, the obligatory position held by the Government of the Grand Duchy of Baden, as member of the Germanic Confederation.

In witness whereof, We have signed these presents and have caused to be affixed Our Seal of State.

Given at Carlsruhe, the sixteenth of December of the year of grace one thousand eight hundred and sixty-four, of our reign, the thirteenth.

[L. S.]

FREDERIC.
ROGGENBACH.

By order of His Royal Highness:
RECK.

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c. OF BELGIUM.

LEOPOLD, King of the Belgians, to all present and to come, greeting:

Having seen and examined the Convention, signed at Geneva, the 22d of August, 1864, between Belgium, the Grand Duchy of Baden, Denmark, Spain, France, the Grand Duchy of Hesse, Italy, the Netherlands, Portugal, Prussia, the Swiss Confederation, and Würtemberg, for the amelioration of the condition of soldiers wounded in armies in the field, the tenor of which Convention is as follows:

(See above.)

We, being satisfied with the preceding Convention, do approve, ratify and confirm it, promising to enforce its observance according to its form and tenor, without allowing it to be infringed in any manner whatsoever.

In witness whereof, We have signed the present letters of ratification and have caused to be affixed thereunto Our Royal Seal.

Given at Laeken, the fourteenth day of the month of October, of the year of grace one thousand eight hundred and sixty-four.

[L. S.]

LEOPOLD.

By the King:
The Minister of Foreign Affairs,
CH. ROGIER.

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d. OF DENMARK

We, CHRISTIAN the Ninth, by the grace of God, King of Denmark, the Vandals and the Goths, Duke of Schleswig-Holstein, Stormarn, Ditmarsch, Lauenburg, and Oldenburg, hereby make known:

That We, after having read and considered the Convention for the improvement of the condition of the wounded on battle-fields, signed by the respective Plenipotentiaries, between Us, the Swiss Confederation, His Royal Higness the Grand Duke of Baden, His Majesty the King of the Belgians, Her Majesty the Queen of Spain, His Majesty the Emperor of the French, His Royal Highness the Grand Duke of Hesse, His Majesty the King of Italy, His Majesty the King of the Netherlands, His Majesty the King of Portugal, His Majesty the King of Prussia, and His Majesty the King of Würtemberg, at Geneva, on the 22d of August ultimo, which Convention is, word for word, as follows:

(See above.)

Have approved, established, and ratified the said Convention, as We also hereby approve, establish, and ratify the same in the best and strongest manner possible, both for Us and Our Successors, promising with Our Royal Word, for Ourselves and for Them, strictly to observe and execute the said Convention in all its words and points.

In testimony whereof, We have signed the ratification with Our own hand and caused Gur Great Royal Seal to be thereunto affixed.

Done at Copenhagen, our capital and the city of our residence on the 15th day of December, A. D. 1864, the second year of Our Reign.

[L. S.] CHRISTIAN.

BLUHME.

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e. OF SPAIN.

ISABELLA the Second, by the grace of God and the Constitution of the Spanish Monarchy Queen of Spain:

Whereas, was arranged, concluded and signed at Geneva the twenty-second day of August of the present year one thousand eight hundred and sixty-four, by Don José Heriberto Garcia de Quevedo, General Guillermo Enrique Dufour, Mr. Gustave Moynier, Colonel Samuel Lehmann, Messrs. Robert Volz, Adolphe Steiner, Auguste Visschers, Charles Emile Fenger, George Charles Jagerschmidt, Henri Eugène Seguineau de Préval, Martin François Boudier, Charles Auguste Brodrück, Jean Capello, Felix Baroffio, Bernard Ortuinus, Theodore-Henri Westenberg, José Antonio Marques, Charles Albert de Kamptz, Godefroi Frederic François Loeffler, George Hermann, Jules Ritter and Christophe Ulric Hahn, Plenipotentiaries named for the purpose in due form, a Convention to improve the condition of soldiers wounded on the field, concluded between Us, the Swiss Confederation, the Grand Duke of Baden, the King of the Belgians, the King of Denmark, the Emperor of the French, the Grand Duke of Hesse, King Victor-Emmanuel, the King of the Netherlands, the King of Portugal, the King of Prussia, and the King of Würtemberg, the Convention being composed of ten articles in the French language, the tenor of which, word for word, is as follows:

(See above.)

Therefore having seen and examined one by one the ten articles contained in the above-mentioned Convention, We have approved and ratified all its contents and do by these presents approve and ratify in the best and most ample form in Our power, promising on the faith of Our Royal Word, to fulfill and observe it and have it fulfilled and observed accurately in all its parts, and for its greater validity and strength we issue these presents signed by Our Hand, sealed with Our privy seal and countersigned by Our First Secretary of State.

Given at the Palace of Madrid, the fifth of December, one thousand eight hundred and sixty-four.

[L. S.] I, the QUEEN.

ALEJANDRO LLORENTE.

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f. OF FRANCE.

NAPOLEON, by the grace of God and the will of the nation Emperor of the French,
To all who shall see these presents, greeting:

An international Convention for the amelioration of the condition of the wounded on battle-fields, having been signed at Geneva, the 22d of August, 1864;

Which Convention has the following tenor:

(See above.)

We, having seen and examined the said Convention, have approved and do approve of it in all and singular the dispositions therein contained; We declare it accepted, ratified and confirmed, and promise that it shall be inviolably observed.

In faith whereof We have given these presents, signed by our hand and sealed with our Imperial Seal.

Done at St. Cloud, the 22d of September, of the year of grace 1864.

[L. S.] NAPOLEON.

By the Emperor:

DROUYN DE LHUYS.

g. OF ITALY.

VICTOR EMMANUEL II, by the grace of God and the will of the Nation King of Italy,
To all who shall see these presents, greeting:

An international Convention to improve the fate of soldiers wounded in war, having been concluded and signed at Geneva, the twenty-second day of the month of August, of the present year, one thousand eight hundred and sixty-four,

Which Convention has the following tenor:

(See above.)

We, having seen and examined the above-written international Convention, and approving of it in all and singular its parts, have accepted, ratified and confirmed it, and do by these presents, accept ratify, and confirm it, promising to observe it and to make it be observed inviolably.

In faith whereof, We have signed these present letters of ratification and have caused to be affixed thereunto Our Royal Seal.

Given at Turin the fourth day of the month of December, of the year of our Lord one thousand eight hundred and sixty-four, and of Our Reign the sixteenth.

[L. S.] VICTOR EMMANUEL.

By request of His Majesty the King,
The president of the Council, Minister Secretary of State for Foreign Affairs:
ALF. LA MARMORA.

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h. OF THE NETHERLANDS.

WILLIAM III, by the grace of God King of the Netherlands, Prince of Orange, Nassau,
Grand Duke of Luxemburg, &c., &c., &c.:

Having seen and examined the Convention for the amelioration of the condition of soldiers wounded in the armies in the field, concluded and signed at Geneva the twenty-second of August, one thousand eight hundred and sixty-four, by Our Plenipotentiary and the Plenipotentiaries of the Swiss Confederation, His Royal Highness the Grand Duke of Baden, His Majesty the King of the Belgians, His Majesty the King of Denmark, Her Majesty the Queen of Spain, His Majesty the Emperor of the French, His Royal Highness the Grand Duke of Hesse, His Majesty the King of Italy, His Majesty the King of Portugal and the Algarves, His Majesty the King of Prussia, and His Majesty the King of Würtemberg, respectively named and designated to that effect, the tenor of which Convention, word for word, is as follows:

(See above.)

We approve the above Convention in all the dispositions therein contained, declare it accepted, ratified and confirmed, and promise that it shall be executed and observed according to its form and tenor.

In faith whereof, We have given these presents, signed by Our hand and sealed with Our Royal Seal at The Hague, the twenty-ninth day of the month of November, of the year of grace one thousand eight hundred and sixty-four.

[L. S.] WILLIAM.

The Minister of Foreign Affairs:
E. CREMERS.

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i. OF PRUSSIA.

We WILLIAM, by the grace of God King of Prussia, to wit by these presents:

Considering we have agreed with the Swiss Confederation, His Royal Highness the Grand Duke of Baden, Their Majesties the King of the Belgians, the King of Denmark, the Queen of Spain, the Emperor of the French, His Royal Highness the Grand Duke of Hesse, Their Majesties the King of Italy, the King of the Netherlands, the King of Portugal and the Algarves, and His Majesty the King of Würtemberg, to lay down the principles of an international character for the amelioration of the condition of soldiers wounded in armies in the field; and Our Plentipotentiaries having concluded, signed and exchanged with the Plenipotentiaries of the above-mentioned States, at Geneva, on the 22d day of August, 1864, the following Convention:

(See above.)

We, after having read and examined the said Convention, have found it, in all respects, conformable to Our will.

In consequence, We have approved, confirmed and ratified it, and do approve, confirm and ratify it by these presents, for Ourselves and Our successors, promising on Our faith and kingly word to have all its stipulations scrupulously accomplished without infringing it or allowing that it should be infringed.

In faith whereof, We have signed the present act of ratification with Our hand and have had it provided with Our Royal Seal.

Done at Berlin, the fourth of January of the year one thousand eight hundred and sixty-four, and of Our reign the fifth.

[L. S.] WILLIAM.

V. BISMARCK.

NOTE.—The above ratifications were exchanged on the 22d of June, 1865, at Geneva, between the Plenipotentiaries above mentioned.

ACTS OF ADHESION.

The following States have adhered subsequently to the Convention for the amelioration of the condition of soldiers wounded on the field:

Sweden	December 13, 1864.
Greece	January 5–17, 1865.
Great Britain	February 18, 1865.
Mecklenburg-Schwerin	March 9, 1865.
Turkey	July 5, 1865.
Würtemberg	June 2, 1866.
Hesse	June 22, 1866.
Bavaria	June 30, 1866.
Austria	July 21, 1866.
Persia	December 5, 1874.
Salvador	December 30, 1874.
Montenegro	November 17–29, 1875.
Servia	March 24, 1876.
Bolivia	October 16, 1879.
Chili	November 15, 1879.
Argentine Republic	November 25, 1879.
Peru	April 22, 1880.

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a. DECLARATION OF ADHESION OF SWEDEN.

We, CHARLES, by the grace of God King of Sweden and Norway, of the Goths and Vandals, to wit:

The Swiss Confederation having, in virtue of Article IX, of the general Convention concluded at Geneva the 22d of August, ultimo, for the amelioration of the condition of the wounded in armies in the field, invited our Government to adhere to the said Convention, the tenor of which is, word for word, as follows:

(See above.)

Therefore, We have accepted and confirmed the said Convention with all its articles, points, and clauses, and by this present act of accession We do accept, confirm and ratify it in the most efficacious manner possible; intending and promising to fulfill loyally and sincerely the said Convention with all its articles, points and clauses.

In faith whereof, We have signed these presents with our hand and have had them provided with Our Royal Seal:

Given at the Castle of Stockholm the 13th day of December, of the year of grace one thousand eight hundred and sixty-four.

[L. S.] CHARLES.

MANDERSTRÔM.

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b. DECLARATION OF ADHESION OF GREECE.

MINISTRY OF FOREIGN AFFAIRS,
Athens, the 5th–17th of January, 1865.

MONSIEUR LE PRÉSIDENT: I have had the honor to receive the letter dated the 14th of November ultimo, in which, transmitting to me a copy of the Convention concluded

at Geneva, between the Helvetic Confederation and several other States for the amelioration of the condition of wounded soldiers in armies in the field, as well as the protocol of the conferences that took place to that effect, Your Excellency kindly forwarded at the same time the invitation made to the Government of His Majesty, my August Sovereign, to adhere supplementarily to the aforesaid Convention.

The Government of the King, having taken cognizance of the contents of these documents, and appreciating the benevolent purpose of the international instrument concluded at Geneva on the 22d of August, 1864, by the noble initiative of the Helvetic Confederation, did not hesitate to associate itself therewith, in the conviction that a unanimous accord on the subject between the European States cannot fail, in fact, to contribute powerfully to the relief of the hardships and suffering that are generally produced by war.

I have, in consequence, the honor to declare, Monsieur le Président, that in virtue of a Royal Ordinance dated December 31, 1864 (January 12, 1865), the Government of His Hellenic Majesty adheres entirely to the above-mentioned Convention.

Accept, Monsieur le Président, the assurance of my very high consideration.

The Minister of Foreign Affairs of His Majesty the King of the Hellenes.

D. S. BOUDOURIS.

To His Excellency the PRESIDENT OF THE CONFEDERATION.

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c. DECLARATION OF ADHESION OF GREAT BRITAIN.

The President and Federal Council of the Swiss Confederation having communicated to the Government of Her Majesty the Queen of the United Kingdom of Great Britain and Ireland a Convention signed at Geneva on the 22d of August, 1864, between the Swiss Confederation, His Royal Highness the Grand Duke of Baden, His Majesty the King of the Belgians, His Majesty the King of Denmark, Her Majesty the Queen of Spain, His Majesty the Emperor of the French, His Royal Highness the Grand Duke of Hesse, His Majesty the King of Italy, His Majesty the King of the Netherlands, His Majesty the King of Portugal and the Algarves, His Majesty the King of Prussia, and His Majesty the King of Würtemberg, for the amelioration of the condition of the wounded in armies in the field, which Convention is, word for word, as follows:

(See above.)

And the Swiss Confederation having, in virtue of Article IX of the said Convention, invited the Government of Her Britannic Majesty to accede thereto;

The undersigned, Her Britannic Majesty's Principal Secretary of State for Foreign Affairs, duly authorized for that purpose, hereby declares that the Government of Her Britannic Majesty fully accedes to the Convention aforesaid.

In witness whereof he has signed the present Act of Accession and has affixed thereto the seal of his Arms.

Done at London the eighteenth day of February, in the year of our Lord, one thousand eight hundred and sixty-five.

[L. S.]

RUSSELL.

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d. DECLARATION OF ADHESION OF MECKLENBURG-SCHWERIN.

FREDERIC FRANCIS, by the grace of God Grand Duke of Mecklenburg, Prince of the Vandals, of Schwerin, and of Ratzburg, Count of Schwerin, Lord of Rostock, of Stargard, &c.:

Having taken cognizance of the Convention the purpose of which is to ameliorate the condition of the wounded in the armies in the field, and which was concluded at Geneva between the Plenipotentiaries of several European Powers, on the 22d of August, 1864, being, word for word, the following:

(See above.)

We, desiring to contribute, for our part, to the accomplishment of the charitable purpose that is the object of this Convention, have determined to accede, and by these presents do formally accede to the said Convention, intending that all and each of its articles shall have the same force and virtue with Us, as if they had been concluded

and signed by Our Plenipotentiary in Our name, and promising not to make or to allow to be made any obstruction whatever to them, but on the contrary to accomplish them faithfully, reserving however, to conform Ourselves to all the decisions that may be taken by the German Diet, relative to the execution of this Convention.

In faith whereof We have signed the present act of accession in Our hand and have had apposed thereunto Our Grand Ducal Seal.

Given at Schwerin, March 9, 1865.

[L. S.]

FREDERIC FRANCIS.

W. v. OERTZEN.

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e. DECLARATION OF ADHESION OF TURKEY.

SUBLIME PORTE, MINISTRY OF FOREIGN AFFAIRS,
July 5, 1865.

The Swiss Federal Council having communicated to the Government of His Imperial Majesty the Sultan, the Convention signed at Geneva the 22d of August, 1864, between the Swiss Confederation, His Royal Highness the Grand-Duke of Baden, His Majesty the King of the Belgians, His Majesty the King of Denmark, Her Majesty the Queen of Spain, His Majesty the Emperor of the French, His Royal Highness the Grand Duke of Hesse, His Majesty the King of Italy, His Majesty the King of the Netherlands, His Majesty the King of Portugal and the Algarves, His Majesty the King of Prussia, and his Majesty the King of Wiirtemberg, for the amelioration of the condition of soldiers wounded in armies in the field, the tenor of which Convention is as follows:

(See above).

And the Swiss Federal Council having, in virtue of Article IX of the above-mentioned Convention, invited the Government of His Imperial Majesty, the Sultan, to give His adhesion to it;

The undersigned, Minister of Foreign Affairs of His Imperial Majesty, the Sultan, duly authorized to that effect by His August Sovereign, declares by these presents that the Sublime Porte accedes completely to the above-mentioned Convention.

In faith whereof he has signed the present Act of Accession, and has affixed thereunto the seal of his arms.

Done at Constantinople the fifth of July, one thousand eight hundred and sixty-five.

[L. S.]

AALI.

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f. DECLARATION OF ADHESION OF WÜRTEMBERG.

A Convention for the improvement of the condition of the wounded in armies in the field was concluded on the 22d of August, 1864, between the representatives of the Governments of several European States, the tenor of which Convention is as follows:

(See above.)

In consequence of difficulties arising as to its form, the Royal Government of Wiirtemberg was unable to sign the ratification reserved for this Convention, although a representative of the said Government had taken part in its conclusion; it therefore reserved itself the right to adhere subsequently to the Convention in virtue of the provision of Article IX, which right of reserve has been admitted by the other signatory States to the Convention, according to the report of the representatives of those States, on the 22d of June, 1865.

In virtue of this reserve, the undersigned Ministry declares that these difficulties having been removed, and with the high approbation of His Majesty the King of Wiirtemberg, the Royal Government accedes to the above Convention in all its contents, and will enforce its execution in all its points.

In faith whereof, the present ministerial declaration has been issued and provided with the royal seal.

Given at Stuttgart, the 2d of June, 1866.

The Royal Minister of Foreign Affairs:

[L. S.]

Baron DE BARNBÜLER.

g. DECLARATION OF ADHESION OF HESSE-DARMSTADT.

A Convention for the improvement of the condition of the wounded in armies in the field was concluded on the 22d of August, 1864, between the representatives of the Governments of several European States, the tenor of which Convention is as follows:

(See above.)

Owing to difficulties arising as to its form, the grand ducal government of Hesse was unable to sign the ratification reserved for this Convention, although a representative of this government had taken part in its conclusion; it therefore reserved to itself the right to accede subsequently to the Convention, in virtue of the provision of Article IX, which right of reserve has been admitted by the other signatory States to the Convention, according to the report of the representatives of those States, on the 22d of June, 1865.

In virtue of this reserve the undersigned Ministry declares that these difficulties having been removed, and with the high approbation of His Royal Highness, the Grand Duke of Hesse, the grand ducal government accedes to the above Convention in all its contents, and will have it executed in all its points, without prejudice, however, to the obligations consequent to its existing relations with the Germanic Confederation.

In faith whereof, the present ministerial declaration has been issued, and provided with the seal of the undersigned Ministry.

Darmstadt, the 22d of June, 1866.

Grand ducal Ministry of Hesse, of the grand ducal household,
and of Foreign Affairs:
Baron DE DALWIGK.

[L. S.]

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h.—DECLARATION OF ADHESION OF BAVARIA.

Ministerial declaration.

The Swiss Federal Council having addressed to the royal Government of Bavaria an invitation to accede to the Convention concluded at Geneva on the 22d of August, 1864, between Switzerland, Baden, Belgium, Denmark, Spain, France, the Grand Duchy of Hesse, Italy, the Netherlands, Portugal, Prussia, and Würtemburg, for the amelioration of the condition of the wounded in armies in the field, the tenor of which Convention is as follows:

(See above.)

The Royal Government of Bavaria, referring to Article IX of this Convention, and after having obtained sovereign authority, declares its accession to it.

In faith whereof the present ministerial declaration has been issued by the Royal Ministry of Foreign Affairs, to which declaration the Swiss Federal Council has responded in an analogous form.

Munich, June 30, 1866.

Royal Ministry of Bavaria, of the Royal Household, and of Foreign Affairs:
Baron V. D. PFORDTEN.
[L. S.]

I.—DECLARATION OF ADHESION OF AUSTRIA.

Declaration of Accession.

The undersigned, Imperial Royal Minister of the Imperial Houshold and of Foreign Affairs, declares by these presents that with the sovereign authorization of His Imperial, Royal, and Apostolic Majesty, and in consideration of Article IX of the Convention, concluded on the 22d of August, 1864, at Geneva, by the Governments of Baden, Belgium, Denmark, France, Hesse, the Netherlands, Portugal, Prussia, Sardinia, Spain, Switzerland, and Würtemberg, relative to the treatment of wounded soldiers in armies in the field, that the government of His Majesty, the Emperor, accedes to the said Convention.

In faith whereof he has signed with own hand the present declaration, and has had affixed unto it the seal of the Ministry of Foreign Affairs.

Vienna, July 21, 1866,

By the Austrian Minister of the Imperial Household and of Foreign Affairs:
ALEXANDER, Count MENSDORFF POUILLY.
[L. S.]
F. M.

PERSIA.

Act of Accession to the Convention of Geneva, signed at Teheran, December 5, 1874.

The Swiss Federal Council having communicated to the Imperial Government of Persia, the Convention concluded at Geneva, on the 22d of August, 1864, between the Governments of Switzerland, Baden, Belgium, Denmark, Spain, France, Hesse, Italy, the Netherlands, Portugal, Prussia, and Würtemberg, for the amelioration of the wounded in armies in the field, the tenor of which Convention is, word for word, as follows:

(Text of the Convention.)

And the Swiss Federal Council, having, in virtue of Article 9 of the aforesaid Convention, sent to the Imperial Government of Persia, an invitation to accede to it,

The undersigned, Minister of Foreign Affairs of Persia, declares by these presents, with the sovereign authorization of His Imperial Majesty, the Shah, that the Government of Persia accedes to the said Convention, promising to have all its stipulations scrupulously accomplished, without infringing it, or allowing it to be infringed.

In faith whereof, he has signed the present declarations and has affixed thereunto the seal of his arms.

Done at Teheran, the fifth of December, one thousand eight hundred and seventy-four.

HOUSSEIN.

SALVADOR.

Act of Accession to the Convention of Geneva, given the 30*th of December*, 1874.

SANTIAGO GONZALEZ, President of the Republic of Salvador, considering:

The Government of the Republic of Salvador having been invited to adhere to the Convention of Geneva of the 22d of August, 1864, for the amelioration of the condition of the wounded on battle-fields, and their neutrality as understood by this highly humanitarian convention being conformable to the principles of civilization,

Decrees:

ARTICLE I. The Government of the Republic of Salvador adopts the aforesaid Convention.

ARTICLE II. The Minister Plenipotentiary of Salvador to France and Belgium will notify this resolution to the Federal Council of Switzerland.

National Palace, San Salvador, December 30, 1874.

S. GONZALEZ.

The Minister of Foreign Affairs:
M. BRIOSA.

MONTENEGRO.

Act of Accession to the Convention of Geneva, signed at Cettigné the $\frac{22}{17}$ *November*, 1875.

We, NICHOLAS I, Prince of Montenegro and the Berdas, etc., etc., etc.

Having been amicably invited to accede to the Convention of Geneva of the 22d of August, 1864, relative to the amelioration of the condition of the wounded in armies of the field, the substance of the principal articles being:

That the ambulances, military hospitals and *personnel* of the said establishments shall be considered as neutral.

That the said *personnel*, after the enemy's occupation, shall be allowed to continue to attend the wounded under treatment, or to retire to rejoin the army to which it belongs.

That the inhabitants who shall give assistance to the wounded, shall be respected and remain free, their house being safeguarded by that very fact.

That soldiers, wounded or sick, shall be sheltered and cared for, to whatever nation they belong, and covered by an absolute neutrality.

And being animated with the desire to affirm our sympathy for the principles of humanity of which this convention is the high and living expression,

Declare Our Adherence to the said Convention and promise to have it observed and executed, in what concerns Us, and not allow any obstacle to interfere with the accomplishment of the international obligations resulting thereof.

In faith whereof, we have signed the present act of accession with our own hand, and have provided it with our seal.

Given at Cettinge the $\frac{17}{26}$ November 1875.

The Prince of Montenegro and the Berdas:
NICOLAS.

The Chief Chancellor of the Principality of Montenegro:
RADONICH.

SERVIA.

Act of Accession to the Convention of Geneva signed at Belgrade, the 24th of March, 1876.

An international Convention for the amelioration of the condition of the wounded on battle-fields having been signed at Geneva, the 22d of August, 1864,

The tenor of which Convention is as follows:

(Text of the Convention.)

The undersigned, Minister of Foreign Affairs of His Serene Highness the Prince of Servia, Milan Obrénovitsch IV, duly authorized to that effect, declares by these presents that the princely government of Servia accedes completely to the above-mentioned Convention.

In faith whereof he has signed the present Act of Accession and has apposed thereunto the seal of his chancery.

Done at Belgrade, the 24th of March, one thousand eight hundred and seventy-six.
G. PAVLOVITCH.

ADHESION OF BOLIVIA, CHILI AND THE ARGENTINE REPUBLIC TO THE CONVENTION OF GENEVA.

The Federal Council of the Swiss Confederation:

Considering the declaration dated from Paris, the 16th of October, 1879, by which His Excellency Mr. Thomas Frias, Envoy Extraordinary and Minister Plenipotentiary of Bolivia to Spain, acting in the name of his government, and availing himself of the faculty reserved in Article IX of the International Convention concluded at Geneva the 22d of August, 1864, for the amelioration of the condition of wounded soldiers in armies in the field, declares that the government of the Republic of Bolivia accedes to this Convention, the tenor of which declaration is as follows:

"The Government of the Republic of Bolivia, having taken cognizance of the Convention signed at Geneva on the 22d of August, 1864, between the Swiss Confederation, His Royal Highness the Grand-Duke of Baden, His Majesty the King of the Belgians, His Majesty the King of Denmark, Her Majesty the Queen of Spain, His Majesty the Emperor of the French, His Royal Highness the Grand-Duke of Hesse, His Majesty the King of Italy, His Majesty the King of the Netherlands, His Majesty the King of Portugal and the Algarves, His Majesty the King of Prussia, and His Majesty the King of Würtemberg, the tenor of which Convention is as follows:

(Text of the Convention.)

"The undersigned, Envoy Extraordinary and Minister Plenipotentiary of Bolivia to the Government of His Majesty the King of Spain, provided for that purpose with special powers by the Government of the Republic of Bolivia, declares by these presents that Bolivia accedes to the above-mentioned convention.

"In faith whereof he has signed the present declaration and has affixed his seal unto it.

"Paris, the sixteenth of October, one thousand eight hundred and seventy-nine (16 October, 1879).

[L. S.] "THOMAS FRIAS."

Declares by these presents:

In virtue of the final regulation of the report on the exchange of ratifications of the said Convention, signed at Berne, the 22d of December, one thousand eight hundred and

sixty-four, it accepts this adhesion, as well in the name of the Swiss Confederation, as in that of the other contracting States, to whom an acknowledgment is hereby given in the present declaration,

In faith whereof, these presents have been signed by the President and Chancellor of the Confederation and provided with the seal of the Federal Council, at Berne, the twenty-first of October, one thousand eight hundred and seventy-nine (October 21, 1879).

In the name of the Swiss Federal Council:

The President of the Confederation:

HAMMER.

[L. S.]

The Chancellor of the Confederation:

SCHIESS.

The accession of Chili has been given in the same terms by declaration of His Excellency Mr. A. Blest Gana, Envoy Extraordinary and Minister Plenipotentiary of Chili to France, in date of Paris the 15th of November, 1879. It was accepted, also, in the same terms, by the Federal Council of the Swiss Confederation at Berne, the 27th of November, 1879.

The accession of the Argentine Republic has been given, also, in the same terms, by declaration of His Excellency, Mr. Balcarce, Envoy Extraordinary and Minister Plenipotentiary of the Argentine Republic to Paris, in date of that city, November 25, 1879. It was accepted, in the same terms also, by the Federal Council of the Swiss Confederation at Berne, November 29, 1879.

ADHESION OF PERU TO THE CONVENTION OF GENEVA.

The Federal Council of the Swiss Confederation:

Considering the declaration dated from Paris, the 22d of April, 1880, by which His Excellency, Mr. Torribio Sanz, Envoy Extraordinary and Minister Plenipotentiary of Peru to Paris, acting in the name of his government, and availing himself of the faculty reserved in Article IX of the International Convention concluded at Geneva, on the 22d of August, 1864, for the amelioration of the condition of wounded soldiers in the armies in the field, declares that the government of Peru accedes to this Convention.

The tenor of the declaration is as follows:

"The government of Peru, having taken cognizance of the Convention signed at Geneva on the 22d of August, 1864, between the Swiss Confederation, His Royal Highness the Grand Duke of Baden, His Majesty the King of the Belgians, etc., etc., for the amelioration of the condition of wounded in armies in the field, the tenor of which Convention is as follows:"

(Text of the Convention.)

"The undersigned Envoy Extraordinary and Minister Plenipotentiary of Peru to the government of the French Republic, provided for the purpose, with special powers, declares by these presents that Peru accedes to the aforesaid Convention.

"In faith whereof, he has signed the present declaration, and has apposed his seal thereunto. Paris, 22d of April, 1880.

TORRIBIO SANZ."

Declares by these presents:

In virtue of the final regulation of the report on the exchange of ratifications of the said Convention, signed at Berne the twenty-second of December, one thousand eight hundred and sixty-four, it accepts this adhesion, as well in the name of the Swiss Confederation as in that of the other contracting States, to whom an acknowledgment is hereby given by the present declaration:

In faith whereof, these presents have been signed by the Vice-President of the Federal Council and the Chancellor of the Confederation, and provided with the Federal seal, at Berne, the 30th of April, one thousand eight hundred and eighty (April 30, 1880).

In the name of the Federal Council:

The Vice-President:

ANDERWERT.

The Chancellor of the Confederation:

SCHIESS.

ADDITIONAL ARTICLES.

In 1868 the following additional articles were proposed and signed at Geneva on behalf of Great Britain, Austria, Baden, Bavaria, Belgium, Denmark, France, Italy, Netherlands, North Germany, Sweden and Norway, Switzerland, Turkey, and Würtemberg.

On July 22, 1870, it was stated by the Swiss Government that all those States on whose behalf the original convention had been signed had adhered to the additional articles, Rome and Spain excepted, but that Russia, whilst agreeing to the additional articles, proposed a supplement to Article XIV, with the view of preventing the abuse to the distinguishing flag of neutrality; that it could not be expected that the declarations of all the contracting States would be received directly, and consequently the final adoption of the additional articles could not take place till a more or less distant time; that the Federal Council of Switzerland had proposed to the North German Confederation and to France to recognize the Convention of Geneva with the additional articles during the war which had just broken out (the Franco-German war) as a *modus vivendi*, and that those Powers had readily acceded to the proposal.

Additional articles to the Convention of Geneva of the 22d August, 1864, *signed at Geneva the 20th of October* 1868.*

The governments of North Germany, Austria, Baden, Bavaria, Belgium, Denmark, France, Great Britain, Italy, the Netherlands, Sweden and Norway, Switzerland, Turkey, and Würtemberg, desiring to extend to armies on the sea the advantages of the Convention concluded at Geneva the 22d of August, 1864, for the amelioration of the condition of wounded soldiers in armies in the field, and to further particularize some of the stipulations of the said Convention, have named for their commissioners:

1. *North Germany:*

HENRI DE ROEDER, Lieutenant-General, Envoy Extraordinary and Minister Plenipotentiary of His Majesty the King of Prussia and of the North Germanic Confederation to the Swiss Confederation, Knight of the Red Eagle, second class, etc., etc.

FREDERIC LOEFFLER, Physician in Chief of the Army, Professor of Military Medicine, Knight of the Order of the Crown, second class, with crossed swords, etc., etc.

HENRY KOHLER, Naval Captain, Chief of Division at the Ministry of the Navy, Knight of the Order of the Crown, third class, etc.

2. *Austria:*

Dr. JAROMIR, Baron MUNDY, Staff Physician of first-class, Commander of the Order of His Majesty Emperor Francis Joseph of Austria, King of Hungary.

3. *Baden:*

ADOLPHE STEINER, Chief Staff Physician, Knight of the first class of the order of the Lion of Zaehringen, with oak-leaf.

4. *Bavaria:*

THEODORE DOMPIERRE, Chief Physician of first class, Knight of the order of St. Michael.

5. *Belgium:*

AUGUST VISSCHERS, Councillor of the Council of Mines of Belgium, Officer of the Order of Leopold.

6. *Denmark:*

JOHN BARTHÉLEMY GAÏFRE GALIFFE, L.D., Consul of His Majesty the King of Denmark to the Swiss Confederation, Knight of the order of Danebrog and of the order of Saints Maurice and Lazarus.

7. *France:*

AUGUST COUPVENT DES BOIS, Rear-Admiral, Commander of the imperial order of the Legion of Honor, etc., etc.

HENRY EUGÈNE SEGUINEAU DE PRÉVAL, military subcommissioner of first class, officer of the imperial order of the Legion of Honor, etc., etc.

8. *Great Britain:*

JOHN SAVILLE LUMLEY, Envoy Extraordinary and Minister Plenipotentiary of Her Britannic Majesty to the Swiss Confederation.

HASTINGS REGINALD YELVERTON, Rear-Admiral in the service of Her Britannic Majesty, Companion of the Order of the Bath.

These articles have been approved of by all the signatory States of the Convention of 1864, except by the ex-Pontifical States.

9. *Italy:*

FELIX BAROFFIO, Physician in Chief, Knight of the Order of Saints Maurice and Lazarus, of the order of the Crown of Italy.

PAUL COTTRAU, Captain of frigate, Knight of the order of Saints Maurice and Lazarus, decorated with the silver medal of military Valor.

10. *The Netherlands:*

YONKEER HERMANN ADRIEN VAN KARNEBECK, Vice-Admiral, Aide-de-camp extraordinary to His Majesty the King of the Netherlands, decorated with the civil and military orders and the crosses and medals of 1815, of 1830 of the Netherlands, and of the campaigns of Yava, Grand Cross of the military orders of Christ and of Tunis, grand officer of the order of Charles the Third of Spain, Commander of the orders of St. Anne of Russia, in diamonds, of Leopold of Belgium and of the Falcon of Saxe-Weimar, Knight of the Legion of Honor, decorated with the medal of St. Helena.

BERNARD ORTUINUS THEODORE HENRI WESTENBERG, L. D. Councillor of Legation of His Majesty the King of the Netherlands, Commander of the Oaken Crown, Grand Commander of the order of St. Michael of Bavaria, Knight of the orders of Charles III of Spain, of the Crown of Prussia, of Danebrog, of Denmark, and of Adolphe of Nassau.

11. *Sweden and Norway:*

FERDINAND NATHANIEL STAAF, Lieutenant Colonel, military attaché of the Legation of Sweden and Norway in Paris, Knight of the Royal Orders of the Sword of Sweden and of Saint Olaf of Norway, officer of the imperial order of the Legion of Honor, as well of Public Instruction in France, Knight of the imperial order of the Iron Crown of Austria, etc., etc.

12. *Switzerland:*

GUILLAUME HENRI DUFOUR, ex-general in chief of the federal army, Grand Cross of the Legion of Honor.

GUSTAVE MOYNIER, President of the International Committee for the relief of the wounded, officer of the order of Saints Maurice and Lazarus, Knight of first class of the order of the Lion of Zaehringen, Knight of the Orders of the Polar Star and of Our Lady of the Conception of Villa-Visçosa, etc., etc.

SAMUEL LEHMANN, Federal Colonel, physician in chief of the federal army, member of the National Council.

13. *Turkey:*

HUSNY EFFENDI, Major, military attaché of Turkey to Paris, decorated with the imperial order of Medjidié of the fifth class.

14. *Würtemberg:*

CHRISTOPHE HAHN, Doctor of philosophy and theology, member of the central direction for charitable institutions, President of the committee from Würtemberg for the wounded, Knight of the Order of Frederic and of Saints Maurice and Lazarus.

EDOUARD FICHTE, M. D., physician in chief of the army of Wurtemberg and the Order of the Crown of Prussia, of third class;

Who, having been duly authorized to that effect, agreed, under reserve of approbation from their Governments, to the following dispositions:

ARTICLE I. The persons designated in Article II of the Convention shall, after the occupation by the enemy, continue to fulfil their duties, according to their wants, to the sick and wounded in the ambulance or the hospital which they serve. When they request to withdraw, the commander of the occupying troops shall fix the time of departure, which he shall only be allowed to delay for a short time in case of military necessity.

ART. II. Arrangements will have to be made by the belligerent powers to ensure to the neutralised person, fallen into the hands of the army of the enemy, the entire enjoyment of his salary.

ART. III. Under the conditions provided for in Articles I and IV of the Convention, the name "ambulance" applies to field hospitals and other temporary establishments, which follow the troops on the field of battle to receive the sick and wounded.

ART. IV. In conformity with the spirit of Article V of the Convention, and to the reservations contained in the protocol of 1864, it is explained that for the appointment of the charges relative to the quartering of troops, and of the contributions of war, account only shall be taken in an equitable manner of the charitable zeal displayed by the inhabitants.

ART. V. In addition to Article VI of the Convention, it is stipulated that, with the reservation of officers whose detention might be important to the fate of arms and within the limits fixed by the second paragraph of that article, the wounded fallen into the hands of the enemy shall be sent back to their country, after they are cured,

or sooner if possible, on condition, nevertheless, of not again bearing arms during the continuance of the war.

ART. VI. The boats which, at their own risk and peril, during and after an engagement pick up the shipwrecked or wounded, or which having picked them up, convey them on board a neutral or hospital ship, shall enjoy, until the accomplishment of their mission, the character of neutrality, as far as the circumstances of the engagement and the position of the ships engaged will permit.

The appreciation of these circumstances is entrusted to the humanity of all the combatants. The wrecked and wounded thus picked up and saved must not serve again during the continuance of the war.

ART. VII. The religious, medical, and hospital staff of any captured vessel are declared neutral, and, on leaving the ship, may remove the articles and surgical instruments which are their private property.

ART. VIII. The staff designated in the preceding article must continue to fulfil their functions in the captured ship, assisting in the removal of wounded made by the victorious party; they will then be at liberty to return to their country, in conformity with the second paragraph of the first additional article.

The stipulations of the second additional article are applicable to the pay and allowance of the staff.

ART. IX. The military hospital ships remain under martial law in all that concerns their stores; they become the property of the captor, but the latter must not divert them from their special appropriation during the continuance of the war.

The vessels not equipped for fighting, which, during peace, the government shall have officially declared to be intended to serve as floating hospital ships, shall, however, enjoy during the war complete neutrality, both as regards stores, and also as regards their staff, provided their equipment is exclusively appropriated to the special service on which they are employed.

ART. X. Any merchantman, to whatever nation she may belong, charged exclusively with removal of sick and wounded, is protected by neutrality, but the mere fact, noted on the ship's books, of the vessel having been visited by an enemy's cruiser, renders the sick and wounded incapable of serving during the continuance of the war. The cruiser shall even have the right of putting on board an officer in order to accompany the convoy, and thus verify the good faith of the operation.

If the merchant ship also carries a cargo, her neutrality will still protect it, provided that such cargo is not of a nature to be confiscated by the belligerents.

The belligerents retain the right to interdict neutralised vessels from all communication, and from any course which they may deem prejudicial to the secrecy of their operations. In urgent cases special conventions may be entered into between commanders-in-chief, in order to neutralize temporarily and in a special manner the vessels intended for the removal of the sick and wounded.

ART. XI. Wounded or sick sailors and soldiers, when embarked, to whatever nation they may belong, shall be protected and taken care of by their captors.

Their return to their own country is subject to the provisions of Article VI of the Convention, and of the additional Article V.

ART. XII. The distinctive flag to be used with the national flag, in order to indicate any vessel or boat which may claim the benefits of neutrality, in virtue of the principles of this Convention, is a white flag with a red cross. The belligerents may exercise in this respect any mode of verification which they may deem necessary.

Military hospital ships shall be distinguished by being painted white outside, with green strake.

ART. XIII. The hospital ships which are equipped at the expense of the aid societies, recognized by the governments signing this Convention, and which are furnished with a commission emanating from the sovereign, who shall have given express authority for their being fitted out, and with a certificate from the proper naval authority that they have been placed under his control during their fitting out and on their final departure, and that they were then appropriated solely to the purpose of their mission, shall be considered neutral, as well as the whole of their staff. They shall be recognized and protected by the belligerents.

They shall make themselves known by hoisting, together with their national flag, the white flag with a red cross. The distinctive mark of their staff, while performing their duties, shall be an armlet of the same colors.

The outer painting of these hospital ships shall be white, with red strake.

These ships shall bear aid and assistance to the wounded and wrecked belligerents, without distinction of nationality.

They must take care not to interfere in any way with the movements of the combatants. During and after the battle they must do their duty at their own risk and peril.

The belligerents shall have the right of controlling and visiting them; they will be at liberty to refuse their assistance, to order them to depart, and to detain them if the exigencies of the case require such a step.

The wounded and wrecked picked up by these ships cannot be reclaimed by either of the combatants, and they will be required not to serve during the continuance of the war.

ARTICLE XIV.—In naval wars any strong presumption that either belligerent takes advantage of the benefits of neutrality, with any other view than the interest of the sick and wounded, gives to the other belligerent, until proof to the contrary, the right of suspending the Convention, as regards such belligerent.

Should this presumption become a certainty, notice may be given to such belligerent that the Convention is suspended with regard to him during the whole continuance of the war.

ART. XV.—The present Act shall be drawn up in a single original copy, which shall be deposited in the Archives of the Swiss Confederation.

An authentic copy of this Act shall be delivered, with an invitation to adhere to it, to each of the signatory Powers of the Convention of the 22d of August, 1864, as well as to those that have successively acceded to it.

In faith whereof, the undersigned commissaries have drawn up the present project of additional articles and have apposed thereunto the seals of their arms.

VON ROEDER.
F. LÖFFLER,
KÖHLER.
DR. MUNDY.
STEINER.
DR. DOMPIERRE.
VISSCHERS.
J. B. G. GALIFFE.
D. FELICE BAROFFIO.
PAOLO COTTRAU.
H. A. VAN KARNEBECK.
WESTENBERG.
F. N. STAAFF.
G. H. DUFOUR.
G. MOYNIER.
A. COUPVENT DES BOIS.
H. DE PRÉVAL.
JOHN SAVILLE LUMLEY.
H. R. YELVERTON.
DR. S. LEHMANN.
HUSNY.
Dr. C. HAHN.
Dr. FICHTE.

47TH CONGRESS, 1st Session. } SENATE. { EX. DOC. No. 7.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING,

In compliance with Senate resolution of May 17, 1881, *a copy of the report of Capt. O. H. Ernst, Corps of Engineers, upon the survey of the Osage River between the mouth of Rainey Creek and Tuscumbia.*

DECEMBER 12, 1881.—Referred to the Committee on Commerce and ordered to be printed.

WAR DEPARTMENT,
Washington City, December 8, 1881.

The Secretary of War has the honor to transmit to the United States Senate, in compliance with the resolution of the Senate of May 17 last, a copy of the report of Capt. O. H. Ernst, Corps of Engineers, upon the survey of the Osage River between the mouth of Rainey Creek and Tuscumbia, and accompanying paper, together with a letter dated May 20, 1881, from the Chief of Engineers submitting the same.

ROBERT T. LINCOLN,
Secretary of War.

The PRESIDENT *pro tempore*
of the United States Senate.

OFFICE OF THE CHIEF OF ENGINEERS,
UNITED STATES ARMY,
Washington, D. C., May 20, 1881.

SIR: I have the honor to return herewith the resolution of the Senate of the United States of the 17th inst., directing the Secretary of War—

To transmit to the Senate the report of Capt. O. H. Ernst on the survey of the Osage River made in March, 1881, with any accompanying papers, &c.,

which was referred to this office for report, and, in compliance with its requirements, to submit herewith a copy of the report of Capt. O. H. Ernst, Corps of Engineers, upon the survey of the Osage River between the mouth of Rainey Creek and Tuscumbia, and accompanying paper. The eleven sheets of drawings transmitted with Captain Ernst's report are in great detail and will require much time for copying. They are not prepared with a view to printing, and copies are, therefore, not submitted.

Very respectfully, your obedient servant,

H. G. WRIGHT,
Chief of Engineers, Brig. and Bvt. Maj. Gen.

Hon. ROBERT T. LINCOLN,
Secretary of War.

SURVEY OF OSAGE RIVER, MISSOURI, FROM TUSCUMBIA TO MOUTH OF RAINEY CREEK.

UNITED STATES ENGINEER OFFICE,
Saint Louis, Mo., April 21, 1881.

GENERAL: I have the honor to transmit, herewith, tracings of the maps of the Osage River between the mouth of Rainey Creek and Tuscumbia, ten sheets of plan and one sheet of profile, surveyed last autumn by Mr. S. E. McGregory, assistant engineer, under the authority contained in your letter of July 8, 1880. The report of Mr. McGregory is also transmitted.

Upon each sheet of plans is a portion of the river platted upon a scale of $\frac{1}{10000}$. Upon the same sheet a separate plan of each shoal is given upon a scale of $\frac{1}{2500}$. The profile shows the bottom of the river in the channel, the elevation of both banks, and the low-water slope, the zero of the profile being the low-water line at Tuscumbia. The horizontal scale of the profile is $\frac{1}{10000}$, and the vertical scale is 1 inch to 6 feet. Distances are given in miles from Rainey Creek upon both plan and profile, being marked upon the former in red ink and upon the latter in black.

The length of river covered by the survey is 79½ miles. In this distance it receives but one important tributary, the Niangua River, which enters it from the south—see sheet 4—about 30½ miles below Rainey Creek. The Niangua is reported by Mr. McGregory to be "a stream of considerable size, which is fed by perennial springs, and from which the Osage derives nearly one-half of its supply during low-water."

The fall between Rainey Creek and the Niangua is 24.08 feet in 30½ miles, or 9.47 inches per mile, and between the Niangua and Tuscumbia 41 feet in 49 miles, or 10.04 inches per mile. This fall is not by any means uniform. The river consists of a series of deep lakes or pools, upon which there is practically no fall, separated by shoals upon which all the fall is concentrated.

In the pools the movement of the water is imperceptible and the velocity cannot be accurately measured. The shoals are usually composed of coarse gravel, through which a large portion of the water finds its way by leakage. The area of cross-section of the stream has here to be estimated. These circumstances render it very difficult to measure the low-water discharge of the river. No new discharge observations were made by Mr. McGregory. The discharge at ordinary low water was estimated by Mr. Wm. M. Gordon, in 1875, to be 350 cubic feet per second, though the discharge actually measured by him at Alfred's Shoal, above Rainey Creek, was but 64 cubic feet per second (see Annual Report of Chief of Engineers for 1875, page 496). In an unpublished report on file in this office, dated July 24, 1873, upon the survey of the river below Tuscumbia, the discharge is given by Mr. A. H. Blaisdell, assistant engineer, at 277 cubic feet per second.

It is quite certain that the low-water discharge does not exceed 300 cubic feet per second, and that, considering the porous character of the soil, a much less quantity is available for purposes of navigation.

The range of the Osage is 39½ feet. At high-water it is a vast body of water flowing with the great velocity due to a slope of about 10 inches to the mile, and capable of moving heavy gravels and modifying its bed with great facility.

Between Rainey Creek and Tuscumbia there are fifty-six shoals which are now prominent, or one to every 1.4 miles. Of these, thirty-three have been the subject of "improvement" by the State of Missouri. The

works are shown upon the maps. What the order of construction of these works was and what were the results at first obtained by them are points about which I have no information. They seem to have been designed to concentrate the flow over the shoals into a narrow space, with a view to excavating a permanent channel through them. Many of the works are badly located, if they are to be judged by the state of affairs now existing, and some of them are in a dilapidated condition; but their universal failure is due, perhaps, not so much to these causes as to the fact that they were designed to accomplish an impossible task.

A list of the shoals and their distances below Rainey Creek, and the elevation of the water surface at the head and at the foot of each shoal, is given in tabular form in Mr. McGregory's report.

An examination of the plan shows that these shoals are not found at places where the low-water width is unusually great. On the contrary, the width is usually less than in the pools. The stream is contracted both horizontally and vertically, and the shoals therefore constitute true natural dams. The profile shows the fifty-six shoals acting in that capacity. Above each shoal is a pool with horizontal, or nearly horizontal, surface, and below is a similar pool.

There is an important distinction between the Osage River at low stage as a flowing stream, and as a body of navigable water. Its dimensions in the first respect are dependent upon its drainage area and the annual rain-fall, and these cannot be altered by the engineer. Its dimensions in the second respect are dependent upon its reservoir capacity, and this may be enlarged or diminished by engineering works. As a flowing stream alone it is an insignificant creek, discharging less than 300 cubic feet of water at its mouth. As a body of navigable water it is at this time a series of capacious lakes, but the communication between the lakes is difficult.

These 56 natural dams, or their equivalent, are a necessity of the river if its present capacity as a body of navigable water is to be retained. The removal of any one of them will lower the surface of the pool above. Irregularities of the bed which are now deeply submerged will be brought nearer to the surface and new shoals will be developed. The removal of these will develop others and will reduce the depth upon the shoals already improved, bringing them again into prominence. At each locality there will thus be a long series of alternate improvement and deterioration.

If the range of the Osage were moderate, and there were no tributaries to disturb this process by the introduction of new supplies of gravel, it might be practicable in the course of time, by a vigorous application of dredges, wing-dams, and training-walls, to bring the entire river to the condition of a canal with uniform cross-section and uniform slope, and of uniform depth throughout. In that condition its navigability would have reached the highest state of perfection of which the free-flowing channel is capable. The body of water, however, would be a minimum. The lakes would all be drained, and would be replaced by a stream of which the width would not exceed 80 feet and the depth 2 feet. The existence of gravel-bearing tributaries and the high-water character of the stream will prevent the realization of such an ideal river; some parts will always be deeper than others. As this ideal, however, is the highest result at which we can aim with a system of open-channel improvement, the supposition that it has been accomplished will allow the merits of the system to be judged under the circumstances most favorable to it.

A stream 80 feet wide and 2 feet deep will not be adapted to the com-

merce of the Osage Valley, either present or prospective. Statistics of the commerce of the river during the six months ending December 31, 1880, have recently been collected under my direction by Mr. W. S. Simpson, assistant engineer, and have been made as complete as practicable. They are as follows, viz:

Carried by boat.

	Quantity.	Value.	Weight.	Freight charges.
			Tons.	
Wheat ..... bushels..	128,350	$128,350 00	3,850	$7,700 00
Flour ..... barrels..	600	3,600 00	59	118 00
Baryta ..... do....	341	6,885 00	153	306 00
Brick	190,000	950 00	388	776 00
Miscellaneous	Unknown.	Unknown...	405	810 00
Pine lumber ..... feet..	100,000	2,000 00	.....	.....
Wood ..... cords..	485	1,212 50	.....	.....
Total value	.....	142,997 50		

Rafted.

	Valued at—
Railroad ties, 709,805	$283,922
Oak logs, 2,000,000 feet	20,000
Walnut logs, 300,000	7,500
Total value	311,422

These statistics show the rafting interest to be about double the boating interest. They cover a period during which the low-water season occurs, and it is probable that if an entire year were included the relative proportions of these interests would be altered. But it will be safe, I think, to regard the rafting interest as at least equal to if not greater than the boating interest. To reduce the Osage from a width of 400 feet to 80 feet throughout its length will be an injury to that interest which will not be mitigated by the increased depth upon the shoals.

A depth of 2 feet will enable the few small steamboats now employed to navigate the river for a larger part of the year, carrying passengers, the mail, and small quantities of freight, but it is evident that the depth is not well adapted to the cheap transportation of heavy freight. The amount of commerce now existing, as shown by the statistics, is no measure of what this stream will one day be called upon to carry. It is to its prospective rather than to its present commercial importance that the improvement should be adapted. The valley possesses great stores of iron, coal, lead, zinc, marble, and other useful minerals. A 2-foot navigation will not aid in any material degree to develop these resources, and after they are developed it will be regarded as absolutely insufficient.

The works required to give this depth are in direct conflict with those required to give a greater depth, viz, locks and dams. They result in reducing the volume of navigable water, while it should be increased. They constitute solid obstructions in the bed of the river, rising to a height of 3′ 6″ above low-water, which it will be necessary to remove before the present capacity of the stream can be restored. While of doubtful utility for the present needs of commerce—supposing them to be successful—they are a positive injury to the river, taking into account its future necessities. It is hardly necessary, in view of the forego-

ing, to inquire what the effect of draining these lakes would be upon the sanitary condition of the country.

The slack-water improvement of this stream is, I think, only a question of time. It will probably not be seriously undertaken until after the improvement of the Missouri River, into which it empties, and in which there is now a channel depth of but 3 feet. That day may be far distant. It probably is. But in these preliminary operations upon the river it should not be lost sight of. Nothing should be done now which will render that work more difficult or more costly.

While the final results of removing all the shoals are thus seen to be anything but desirable, there are several reasons why that plan should always have its partisans among those immediately interested in the improvement. It permits immediate results to be obtained from small appropriations, and it results in deepening the water at the place where it is first applied. The latter fact causes the casual observer to believe that, if universally applied, it will universally deepen the water. Considering only the present and disregarding the future, he is gratified to find a depth of 2 feet at a spot where he is accustomed to find but 6 inches, and he naturally urges a continuation of the work. Present benefit having a more powerful influence upon his mind than future injury, it might happen that, even after the final results of the system are fully comprehended by him, he would still urge its prosecution.

The river itself possesses a power which will probably prevent the infliction of such evils upon it. Seen at a low stage, it would seem incapable of modifying its own bed to such a degree as to neutralize the work of excavation in a short time. A very different state of affairs exists, however, at high-water. The gravel moved at such times finds a convenient lodgment in the narrow cuts provided by the dredge, and they are promptly filled up. The same thing occurs, though to a larger degree, if there are wing-dams and training-walls, the result being that these works tend rather to increase than to diminish the height of the shoal. The removal of all the shoals can therefore only be attained, if at all, by renewed and persistent efforts with the dredge, and at heavy final cost. The temporary deepening of the water at a few of them only a delusion.

As wing-dams and training-walls combined with dredging, by means of scrapers, have been applied to a portion of the Osage by the government, it is proper to notice the circumstances under which that has been done, and to make inquiry as to the results obtained.

The conclusion that no permanent improvement of the open channel is practicable was reached by my predecessor several years ago. In his annual report for 1875 (see Annual Report of Chief of Engineers, 1875, page 489,) he says:

> Learning by experience that the Osage River could not be permanently improved by wing-dams and training-dikes, under date of September 1, 1874, with the approval of the Chief of Engineers, I instructed my assistant, Mr. William M. Gordon, to survey the river from Osceola or Roscoe to Tuscumbia to ascertain by actual and accurate survey the practicability and cost of a lock and dam navigation.

The report of this survey, which was completed only to the mouth of Rainey Creek, was dated February 11, 1875, and gives a brief sketch of the history of the operations up to that time. (See Annual Report of Chief of Engineers, 1875, page 490.) Upon the statement of facts therein presented, the appropriations for the river ceased, and were not renewed until 1878, when, by the act of June 18, an appropriation was made of $20,000. A portion of this was applied to surveying the upper river from

Ottawa, Kans., to Osceola, Mo., and the balance applied to the improvement of the lower river, below Tuscumbia, by means of wing-dams and training-walls, and dredging as before.

In his annual report for 1879, Colonel Simpson says:

> No estimate of the cost of completing the improvement upon the system practised hitherto has been or can be made.

(See Annual Report of Chief of Engineers, 1879, page 1045.)

The system of open channel improvement was applied by him below Tuscumbia during the seasons of 1878 and 1879, and was continued under my direction during the season of 1880. By the 30th of June, 1880, temporary improvement had been effected upon the greater part of the shoals below Tuscumbia. The obstructions at Shipley's and Burd's shoals had, however, been renewed, and at five other shoals no work has been done.

The appropriation June 14, 1880, being more than sufficient to provide for the works required during the year at these places, the present survey was undertaken in August with a view to preparing plans of improvement for the portion of the river above Tuscumbia. It was supposed at that time the improvement was less temporary than it really was, and that it would be practicable to carry a draught of 2 feet through to Tuscumbia after the execution of the works contemplated at the shoals above referred to. The low-water season of last autumn, however, developed a number of new shoals, upon which the depth was less than 2 feet, thus confirming the opinion of my predecessor.

The slope of the river below Tuscumbia is much more gentle than that above, being but 25 feet in 60 miles, or 5 inches to the mile. The steps in the hydraulic stairway are, therefore, much lower, and can be replaced by an inclined plane much more easily than above Tuscumbia. The success of the system below Tuscumbia would be no guarantee of its success above, while its failure there is evidence that the failure above would be still more emphatic.

The conclusions are—

1st. It is believed to be impracticable to make a continuous improvement by means of dredging or by wing-dams and training-walls, either with or without dredging.

2d. If practicable the result would be of doubtful utility to the present commerce of the valley, and would not adapt the river to its prospective commerce.

3d. The construction of stone dams and training-walls in the bed of the stream is, when taking into account its future necessities, an injury to it.

4th. A lock and dam improvement is the only means of permanently deepening the channel, and the time for seriously undertaking that work seems not to have arrived.

It is accordingly recommended that operations upon the Osage be limited for the present to the removal of overhanging trees from the banks and of such snags and bowlders as may be found in the channel, and that the funds now available, $15,000, exclusive of the appropriation of March 3, 1881, be applied to carrying that work as far as the means will permit, working up stream from Tuscumbia.

Very respectfully, your obedient servant,

O. H. ERNST,
Captain of Engineers.

Brig. Gen. H. G. WRIGHT,
Chief of Engineers, U. S. A.

REPORT OF MR. S. E. M'GREGORY, ASSISTANT ENGINEER.

ENGINEER OFFICE, U. S. ARMY,
Saint Louis, Mo., March 22, 1881.

CAPTAIN: I have the honor to submit my report, together with maps and profile of survey of Osage River made in the months of August, September, and October of last year, under instructions from you, as follows:

* * * * * * *

This survey of the Osage River covers a section not embraced in previous surveys, and completes the survey of the whole river from Ottawa, Kans., to the mouth.

The party was organized at Jefferson City and transferred by government boats to Tuscumbia, which was reached August 25, 1880. As first organized, the party consisted of eleven persons, but as the difficulties increased—occasioned by high-water and sickness in the party—others were added; but at no time did the number reach the maximum allowed in your order.

The survey up stream from Tuscumbia was commenced August 26, and proceeded without interruption until September 3, when a heavy rise in the river made it difficult to move our flat-boat up stream against the increased current without steam power. The water at that time covered all the open spaces along the shores, and the survey had to be continued back in the timber and brush upon the high banks, making progress very difficult and slow. Upon being made acquainted with this condition of things, you ordered the party transferred by steamboat to Rainey Creek, which was reached September 11.

The survey down stream from Rainey Creek was commenced September 13, and progressed more rapidly, being interrupted only by sickness in the party.

The survey down stream closed with that portion made up stream on October 15; but as a portion of the up-stream survey had been made during a temporary rise in the river, it was deemed advisable to continue the line further down the river, to give the low-water shores and connect special surveys and examinations of shoals with previous survey.

The field-work of survey was completed October 18, and by your orders the party was transferred to Jefferson City and discharged.

The work upon the maps (ten in number) and profile was commenced October 23 and is now completed.

The commercial importance of the Osage River has been fully discussed in reports of former surveys and nothing more need be said upon that subject.

Levels were run the whole distance connecting with Gordon's benches at Rainey Creek and Blaisdell's at Tuscumbia.

The total length of this section is 79½ miles with a total fall of 65.08 feet. In Mr. Gordon's report he gives the total fall, as quoted from State engineer's report, as 65 feet.

A line of soundings was taken the total length of the survey along the center of the channel, and cross-sections made upon all the shoal places having less than the required depth at low-water.

The maps of the river are drawn on a scale of $\frac{1}{10000}$ and the shoals or special surveys on a scale of $\frac{1}{2500}$.

The profile shows the bottom of the river and elevations of both banks, low-water slope of the river, and the low-water line at Tuscumbia, which is zero of the profile. The following is a tabular statement giving the names and number of the shoals the distance from Rainey Creek to each shoal, and the elevation of the low-water slope at the head and foot of each shoal. The distances are given in miles from Rainey Creek and are marked in red ink on the map, and corresponding distances in black ink on profile.

Maps, No. of sheet.	No. of shoal.	Name of shoals.	Distance in miles from Rainey Creek.	Elevation of low-water slope at head of shoal.	Elevation of low-water slope at foot of shoal.
No. 1	1	Rainey Creek	0	65.08	63.15
	2	Seth Moore	1¼	63.15	62.81
	3	Byers	3¼	62.81	61.00
	4	Proctor's	4¾	61.00	59.34
	5	McFarlin's	5¾	59.34	58.09
No. 2	6	Rapids	6¾	58.07	55.94
	7	Coffman's	7½	55.85	54.70
	8	Driscoll Island	9	54.40	54.32
	9	Wilson's	10	54.32	52.75

Maps, No. of sheet.	No. of shoal.	Name of shoals.	Distance in miles from Rainey Creek.	Elevation of low-water slope at head of shoal.	Elevation of low-water slope at foot of shoal.
No. 3	10	Henry Cable	12¼	52.67	51.83
	11	Sam Cable No. 1	14	51.76	51.45
	12	Sam Cable No. 2	14⅓	51.45	51.43
	13	Peter Cable	15¾	51.43	49.56
	14	Bollinger Creek No. 1	16½	49.54	48.34
	15	Bollinger Creek No. 2	17	48.34	47.22
	16	Bollinger Creek No. 3	17½	47.22	47.00
	17	Carroll's	18	47.00	46.86
No. 4	18	Porter Mill	22⅓	46.86	45.86
	19	Foster Island	24½	45.79	43.88
	20	Cash Williams	25¾	43.86	41.98
	21	Milbourne Williams	27¾	41.92	41.74
	22	Austin Cranes	30	41.73	41.14
No. 5	23	Lime Creek	31	40.98	38.15
	24	Town	32½	38.11	36.93
No. 5	25	Friar Ear No. 1	33	36.93	35.60
	26	Friar Ear No. 2	33⅝	35.60	35.54
	27	Foley Island	35	35.54	34.14
	28	Big Kinsile	37	34.11	31.28
	29	Little Kinsile	38	31.28	30.85
No. 6	30	Dr. Little	39½	30.76	29.70
	31	Salt Island No. 1	41¼	29.70	27.18
	32	Salt Island No. 2	42½	27.18	27.18
	33	Au Glaize	44	27.09	25.65
	34	Rays No. 1	45¼	25.65	24.91
	35	Rays No. 2	46	24.91	24.50
No. 7	36	Wash. Lamb No. 1	48½	24.50	24.12
	37	Wash. Lamb No. 2	49½	24.12	24.07
	38	Wide Ford	50¼	24.07	23.37
	39	Round Island	51¼	23.37	20.93
	40	Bart Stevens	52⅔	20.93	19.89
	41	Widow Stevens	55½	19.80	19.35
No. 8	42	Big Gravois No. 1	56¾	18.94	18.11
	43	Big Gravois No. 2	57¾	18.11	17.40
	44	Big Gravois No. 3	58	17.40	16.47
	45	Stephen Howser	59¾	16.47	14.48
	46	Middle Howser	61	14.40	13.74
	47	Lower Howser	61½	13.74	13.08
	48	Easter's	62¼	13.08	12.34
No. 9	49	Little Gravois No. 1	67¾	12.14	11.30
	50	Little Gravois No. 2	68¼	11.30	10.79
	51	Granny's Island	69½	10.66	7.94
	52	Russell Island	71⅓	7.94	7.32
	53	A. Brockman	74½	7.32	5.72
No. 10	54	Sim. Brockman's	76	5.61	3.50
	55	Bed Quilt Shoal	77	3.50	3.24
	56	Tuscumbia Shoal	78	3.17	0.00

This portion of the Osage River at low-water is nothing but a succession of deep lakes or pools, connected by one or more shallow streams of running water. It has been known to rise 39½ feet above low-water mark at Tuscumbia. At high-water its character is entirely changed, its average fall being .82 of a foot per mile; it becomes a rapid resistless torrent and has been known to pour such a flood into the Missouri as to cause that river to back up as far as Jefferson City. At such times much of the Osage Valley is under water.

There has been considerable money expended by the State of Missouri in improving many of the shoals on this section of the river; but as the work was done a long time ago, and has received no attention in the way of repair since, it is in some places in a bad condition; the dams being broken either accidentally or intentionally and otherwise injured by the combined action of the floods and floating ice. The stones remaining in place are of large size, and well bedded in the surrounding gravel, and may serve as a good foundation or anchorage for new work, if the location of the dikes and dams is such that they can be utilized.

Fully one-third if not one-half of the water finds its way through the dikes and dams, in numberless little streams, instead of finding its way down the low-water channel intended for it; also a large percentage sinks in the coarse gravel composing the bars, and comes up below in the form of numerous springs. This leakage can only be stopped by spreading upon the upstream slope of the dams and bars a finer material than that of which they are composed, up to the low-water line.

Rock can be obtained on the river banks near all the shoals and in many places without the trouble and expense of quarrying it.

The bars or shoals are usually found immediately below the mouth of some creek or branch that flows into the Osage, and are formed from the gravel that is brought down by said stream. Every little mountain rill and every washout on the steep hill slopes furnishes its quota of gravel, which will always be a source of trouble and obstruction to the permanent navigation of this river.

The perpendicular rock bluffs along the shores are composed either of soft lime or sandstone, and in the process of disintegration large masses are thrown down, often finding a lodgment in the channel of the river, making it dangerous for any one to navigate this stream who does not know the exact location of these rocks, particularly so in the pools, where there is no ripple of the water to indicate their presence.

There are comparatively but few snags to be found in this section of the river, and these can easily be removed.

There are overhanging trees in many places which should be cut down where the low-water channel runs close to the shore, as there is danger of contact with the upper works of steamboats, as was the case with the boat that transferred our party to Rainey Creek.

This section of the river can be divided into two divisions. From Rainey Creek to Lime Creek it can only be made navigable for boats drawing from 12 to 14 inches of water, when the river is at its lowest stage. There are twenty-three shoals in this division.

One-quarter of a mile above Lime Creek is the mouth of the Niangua River, a stream of considerable size, which is fed by perennial springs and from which the Osage derives nearly one-half of its supply during low-water. The other branches of creeks, with the exception of Big Gravois, afford but little water during the dry season, except from local rains. This division can, if the water is all concentrated in one channel, be made navigable for any boat that can pass over the bars below Tuscumbia. There are thirty-three shoals on this division. Above Lime Creek all the bars will need more or less improvement to give 1½ feet of water in the channel at a low stage.

The following shoals on this division have been improved by the State of Missouri: Rainey Creek, Byers, McFarlin's, Rapids, Coffman's, Wilson's, Henry Cable's, Peter Cable's, Bollinger's Creek, Porter Mill, Foster Island, Cash Williams, Melbourne Williams, and Austin Cranes.

The following are the shoals that are impassable for boats drawing more than 14 inches of water: Rainey Creek, Byers, McFarlin's, Rapids, Henry Cable, Peter Cable, Bollinger Creek numbers 1, 2, and 3, Porter Mill, Cash Williams, Melbourne Williams, and Austin Cranes. At the last-named place the channel has filled completely up with gravel. A break has been made in the left wing-dam through which the water rushes with great force, impinging the left bank at such an angle as to make it impossible for any boat to pass with safety when the river is at a low stage. There is also a break in the right wing-dam. The filling of the channel was probably caused by the breaking of the dams and thereby lessening the velocity and scouring power of the water in the channel.

Below Lime Creek the following shoals have been improved by the State of Missouri: Lime Creek, Town, Friar Ear No. 1, Foley Island, Big Kinsile, Little Kinsile, Salt Island No. 1, Au Glaize, Rays No. 1, Wash. Lamb No. 1, Wide Ford, Round Island, Big Gravois No. 1, Lower Howser, Little Gravois No 1, Granny's Island, Russell's Island, A Brockman, and Tuscumbia.

The following shoals will need improvement to give a channel of 2 feet depth at low-water: Lime Creek, Town, Friar Ear Nos. 1 and 2, Foley Island, Big Kinsile, Salt Island No. 1, Au Glaize, Rays Nos. 1 and 2, Round Island, Widow Stephens, Big Gravois Nos. 1, 2, and 3, Stephen Howser, Easters, Little Gravois Nos. 1 and 2, Granny's Island, Russell's Island, A. Brockman's, and Tuscumbia. At some of the above-named places, the shoal extends but a short distance and can be removed by scraping or dredging, and will not need the construction of permanent works.

I would respectfully call your attention to the location of the State dams and dikes. In some cases they are located just below the mouth of some creek, and in such a position as to catch and convey all the gravel that is brought down by said creek, directly into the low-water channel, thus defeating the very object for which they were designed and constructed.

I am under obligations to Assistant Engineer Mr. W. S. Simpson for valuable aid in fitting out party at Jefferson City, also for transportation of myself and party to Tuscumbia and afterwards to Rainey Creek. I acknowledge with pleasure the efficient manner with which my asssitant Mr. John O. Holman has performed his duties in the field and valuable aid rendered in the preparation of the maps and profile in this office.

Very respectfully, your obedient servant,

S. E. McGREGORY,
Assistant Engineer.

Capt. O. H. ERNST,
Corps of Engineers, U. S. A.

47TH CONGRESS, 1st Session. } SENATE. { EX. DOC. No. 8.

LETTER

FROM

THE SECRETARY OF THE TREASURY,

TRANSMITTING,

In compliance with Senate resolution of May 19, 1881, *lists showing the names of all officers, clerks, and other employés borne upon the rolls of that department, not required to be confirmed by the Senate.*

DECEMBER 12, 1881.—Ordered to lie on the table and be printed.

TREASURY DEPARTMENT,
December 7, 1881.

SIR: I have the honor to acknowledge the receipt of Senate resolution of May 19, 1881, which is in the following words:

Resolved, That the Secretaries of State, Treasury, Interior, War, Navy, the Postmaster-General, and the Attorney-General be directed to transmit to the Senate the names of all officers, clerks, and other employés borne upon their rolls respectively, not required to be confirmed by the Senate, and the salary paid to each, together with the date of their appointment, the State to which each is charged, the grade of office held, the compensation received, and whether each of said officers, clerks, or employés is white or colored, and which of such clerks or employés served in the regular or volunteer service of the United States during the war of the rebellion.

In reply I transmit herewith lists showing the names of all officers, clerks, and other employés borne upon the rolls of the Treasury Department, not required to be confirmed by the Senate, on the 1st of October, 1881, the grade or office held, the compensation of each, with the date of appointment, the State to which the same is charged, the color of each appointee, and which of said employés served in the regular or volunteer service of the United States during the war of the rebellion.

Very respectfully,

CHAS. J. FOLGER,
Secretary.

HON. DAVID DAVIS,
President of the Senate pro tempore.

Name.	Grade.	Compensation.	Date of appointment.	State to which charged.	White or colored.	War record.
J. T. Power	Chief clerk	$3,000 00	Apr. 21, 1864	Pennsylvania	White	
H. B. James	Chief of division	2,750 00	Mar. 10, 1864	New York	do	
William F. McLennan	do	2,750 00	Dec. 31, 1870	do	do	Volunteer Army three years.
E. W. Clark	do	2,500 00	Mar. 2, 1871	Ohio	do	Volunteer Army four years.
E. B. Daskam	do	2,500 00	May 25, 1865	Connecticut	do	Volunteer Army.
William Fletcher	do	2,500 00	Sept. 22, 1864	Michigan	do	
George N. Lamphere	do	2,500 00	July 1, 1872	Connecticut	do	Volunteer Army three years.
Darius Lyman	do	2,500 00	Aug. 31, 1863	Ohio	do	Navy.
A. L. Sturtevant	do	2,500 00	Oct. 7, 1862	Massachusetts	do	
George A. Bartlett	Disbursing clerk	2,500 00	Feb. 3, 1870	New Hampshire	do	Volunteer Army four years.
Thomas J. Hobbs	do	2,500 00	May 18, 1853	Maine	do	
Charles H. Millar	Assistant chief, warrant division	2,400 00	June 9, 1871	Massachusetts	do	Volunteer Army.
Charles H. Brown	Assistant chief of division	2,100 00	Jan. 30, 1864	Connecticut	do	Volunteer Army one year.
Charles E. Coon	do	2,100 00	Nov. 7, 1878	New York	do	Volunteer Army one year and nine months.
Walter S. Eaton	do	2,000 00	Apr. 4, 1872	Massachusetts	do	Volunteer Army one year and six months.
Henry N. Gassaway	do	2,000 00	Aug. 16, 1871	New York	do	Volunteer Army four years.
S. A. Johnson	do	2,000 00	Mar. 21, 1865	Ohio	do	Volunteer Army three years.
William B. Morgan	do	2,000 00	Oct. 9, 1865	Pennsylvania	do	149th Pennsylvania Volunteers.
Thomas B. Sanders	do	2,000 00	June 29, 1865	Maine	do	Volunteer Army three years.
Constant S. Trevitt	do	2,000 00	Dec. 21, 1871	New York	do	Volunteer Army.
Ezekiel B. Elliott	Government actuary	2,000 00	July 1, 1881		do	
E. J. Babcock	Stenographer	2,000 00	July 1, 1874	New York	do	Volunteer Army three years.
W. Stewart	Receiving clerk	1,900 00	Sept. 22, 1864	Maryland	do	
Charles H. Dow	Bookkeeper	1,900 00	Aug. 9, 1871	Maine	do	Volunteer Army four years.
A. T. Huntington	do	1,900 00	July 1, 1880	Massachusetts	do	Volunteer Army three years.
Mark Andrews	Clerk, fourth class	1,800 00	May 31, 1864	New York	do	Volunteer Army two and one-half years.
Rafael A. Bayley	do	1,800 00	Feb. 3, 1870	Massachusetts	do	Volunteer Navy.
James Bell	do	1,800 00	Apr. 9, 1867	New York	do	
Bushrod Birch	do	1,800 00	Dec. 11, 1862	District of Columbia	do	
John P. Butler	do	1,800 00	Feb. 26, 1868	do	do	Volunteer Army four years.
C. L. Caron	do	1,800 00	Aug. 18, 1865	New York	do	Volunteer Army three years.
J. M. Chadsey	do	1,800 00	July 2, 1872	Illinois	do	Do.
T. L. De Land	do	1,800 00	Nov. 10, 1871	do	do	
Henry Dunlap	do	1,800 00	Apr. 27, 1867	New York	do	
Andrew Johnson	do	1,800 00	Apr. 11, 1868	West Virginia	do	Volunteer Army two years and ten months.
Thomas G. Jones	do	1,800 00	Sept. 7, 1861	Pennsylvania	do	
G. A. Jordan	do	1,800 00	May 24, 1867	Massachusetts	do	Volunteer Army.
A. M. Judson	do	1,800 00	Feb. 1, 1866	Pennsylvania	do	Volunteer Army three and one-half years.
M. F. Lackey	do	1,800 00	May 5, 1861	District of Columbia	do	
J. G. MacGregor	do	1,800 00	Dec. 19, 1865	Minnesota	do	Volunteer Army three years.
George W. Maher	do	1,800 00	June 1, 1864	District of Columbia	do	Volunteer Army.
J. M. March	do	1,800 00	Feb. 7, 1873	Pennsylvania	do	Volunteer Army three years.
Isaac N. Martin	do	1,800 00	July 1, 1880	Indiana	do	Volunteer Army two years.
Henry S. Merrill	do	1,800 00	Jan. 25, 1872	District of Columbia	do	Volunteer Army.
Edward L. Mills	do	1,800 00	Apr. 30, 1869	Illinois	do	Volunteer Army four years.

Joseph Noble	do	1,800 00	July 23, 1870	Maine	do		Do.
James D. Power	do	1,800 00	Oct. 1, 1869	New York	do		Volunteer Army two and one-half years.
N. A. Robbins	do	1,800 00	Oct. 9, 1865	Maine	do		Volunteer Army four years.
A. U. Rose	do	1,800 00	Dec. 1, 1874	New York	do		Volunteer Army.
Richard Roman	do	1,800 00	July 13, 1877	Illinois	do		Do.
Charles A. Shields	do	1,800 00	Mar. 3, 1870	Mississippi	do		Do.
George Simmons	do	1,800 00	Apr. 1, 1868	District of Columbia	do		Volunteer Army three years and eight months.
Benjamin Swallow	do	1,800 00	Dec. 9, 1865	do	do		
James T. Sweetman	do	1,800 00	Mar. 28, 1865	New York	do		
George W. Taylor	do	1,800 00	Dec. 6, 1867	Pennsylvania	do		
William C. Tyler	do	1,800 00	Oct. 28, 1863	Connecticut	do		Volunteer Army.
W. W. Uttz	do	1,800 00	Aug. 18, 1869	Iowa	do		Volunteer Army two years and two months.
Dayton S. Ward	do	1,800 00	Sept. 16, 1870	New York	do		
George N. West	do	1,800 00	Nov. 12, 1868	Maine	do		
H. C. Whiting	do	1,800 00	May 13, 1865	District of Columbia	do		Volunteer Navy.
W. A. Widney	do	1,800 00	Feb. 5, 1866	Pennsylvania	do		
Jerome Wise	do	1,800 00	May 18, 1873	New York	do		Volunteer Army three years.
George W. Bassett	Clerk, third class	1,600 00	June 16, 1865	New Jersey	do		
Joseph Bowes	do	1,600 00	July 1, 1880	Florida	do		
Albert F. Brooke	do	1,600 00	Apr. 21, 1873	Massachusetts	do		Volunteer Army three years.
S. N. Bynitzky	do	1,600 00	Aug. 15, 1868	District of Columbia	do		
George Y. Coffin	do	1,600 00	Aug. 5, 1872	do	do		
Frank G. Collins	do	1,600 00	June 4, 1874	Massachusetts	do		
Charles R. Dean	do	1,600 00	May 17, 1881	Illinois	do		
Frederick A. Ellis	do	1,600 00	Apr. 1, 1875	Massachusetts	do		
Joseph L. Enderle	do	1,600 00	Mar. 27, 1872	do	do		Volunteer Army.
Henry S. Hall	do	1,600 00	Dec. 1, 1865	Maine	do		Volunteer Army three years.
Mark Heydorn	do	1,600 00	Nov. 29, 1870	Maryland	do		Volunteer Army three years and two months.
Joseph T. Hough	do	1,600 00	Feb. 13, 1879	Tennessee	do		
G. F. Johnston	do	1,600 00	Dec. 11, 1866	District of Columbia	do		
David Kellett	do	1,600 00	June 20, 1875	North Carolina	do		
Oliver R. Merrill	do	1,600 00	Nov. 16, 1874	Maine	do		
L. H. Milliken	do	1,600 00	Nov. 11, 1865	do	do		Volunteer Army.
Charles Murphy	do	1,600 00	May 8, 1869	West Virginia	do		
Clinton G. Rapp	do	1,600 00	Nov. 15, 1875	do	do		
William Richards	do	1,600 00	July 2, 1880	Iowa	do		
Henry K. Simpson	do	1,600 00	July 2, 1873	District of Columbia	do		
Charles S. Steele	do	1,600 00	Apr. 11, 1871	New York	do		
Alexander M. Stout	do	1,600 00	July 2, 1875	Pennsylvania	do		Volunteer Army seven months.
George H. Smith	do	1,600 00	June 11, 1875	Texas	do		Volunteer Army three years.
J. W. Swank	do	1,600 00	Nov. 30, 1866	Pennsylvania	do		
George Wallace	do	1,600 00	Oct. 5, 1870	Massachusetts	do		Volunteer Army two years.
J. R. Adams	Clerk, second class	1,400 00	Sept. 3, 1866	District of Columbia	do		
Oren D. Bragdon	do	1,400 00	July 9, 1880	Louisiana	do		
George E. Channing	do	1,400 00	July 1, 1880	Massachusetts	do		
George H. De Leon	do	1,400 00	July 1, 1880	Florida	do		
Richard Dove	do	1,400 00	Apr. 22, 1867	District of Columbia	do		
J. N. Eldredge	do	1,400 00	May 10, 1870	New York	do		
Clarence R. Ferguson	do	1,400 00	Dec. 21, 1871	do	do		
James N. Fitzpatrick	do	1,400 00	June 1, 1880	Virginia	do		
G. C. Flenner	do	1,400 00	May 17, 1872	District of Columbia	do		
Charles P. Freeman	do	1,400 00	Feb. 16, 1878	Georgia	do		Volunteer Army two years.

OFFICE OF THE SECRETARY OF THE TREASURY—Continued.

Name.	Grade.	Compensation.	Date of appointment.	State to which charged.	White or colored.	War record.
Henry L. Gosling	Clerk, second class	$1,400 00	Aug. 12, 1878	Tennessee	White	
Frederick Grimm	do	1,400 00	Oct. 4, 1879	Illinois	do	
William P. Holl	do	1,400 00	Dec. 3, 1869	New York	do	
Eden Kipp	do	1,400 00	Apr. 16, 1875	do	do	
James R. Lake	do	1,400 00	July 1, 1880	Missouri	do	
John A. Lavender	do	1,400 00	May 1, 1877	New York	do	Volunteer Army.
J. Edmund Mallett	do	1,400 00	Mar. 4, 1878	do	do	Do.
John Moon	do	1,400 00	Oct. 23, 1879	Missouri	do	
E. B. MacGratty	do	1,400 00	July 1, 1880	California	do	Regular Army four years.
Thomas B. Price	do	1,400 00	Dec. 1, 1875	Maryland	do	
Eugene L. Townsend	do	1,400 00	Nov. 19, 1879	Pennsylvania	do	Volunteer Army.
Miss E. J. Brigham	Clerk, first class	1,200 00	Nov. 11, 1871	Massachusetts	do	
Patrick Flynn	do	1,200 00	July 2, 1878	Illinois	do	Volunteer Army two and a half years.
Thomas I. Gaut	do	1,200 00	May 11, 1881	Tennessee	do	
Miss F. M. Gilbert	do	1,200 00	June 24, 1865	New Hampshire	do	
Elisha Goddard	do	1,200 00	July 5, 1881	California	do	
Miss Hannah Hanscom	do	1,200 00	June 18, 1865	Maine	do	
Francis W. Jones	do	1,200 00	May 2, 1881	Illinois	do	
Harman A. Munson	do	1,200 00	Feb. 11, 1881	do	do	
Cassius M. Park	do	1,200 00	June 18, 1879	Kentucky	do	Volunteer Army three years.
Charles M. Paxton	do	1,200 00	July 1, 1880	New York	do	
Edward Purcell	do	1,200 00	Sept. 24, 1861	District of Columbia	do	Volunteer Army.
Miss H. C. Root	do	1,200 00	Nov. 4, 1874	Michigan	do	
George H. Slaybaugh	do	1,200 00	May 6, 1881	Nevada	do	Volunteer Army four years.
William H. Wormersly	do	1,200 00	July 23, 1880	Massachusetts	do	Do.
William R. Baker	Clerk, $1,000 class	1,000 00	May 13, 1861	District of Columbia	do	Volunteer Army four months.
Charles P. Bundick	do	1,000 00	Feb. 23, 1876	New Jersey	do	Volunteer Army.
Clarence P. Dixon	do	1,000 00	July 25, 1878	Colorado	do	
R. F. Keach	do	1,000 00	Oct. 27, 1864	Vermont	do	Volunteer Army two years.
Miss H. L. McL. Kimball	do	1,000 00	Oct. 28, 1863	do	do	
John M. Kline	do	1,000 00	Dec. 2, 1869	Pennsylvania	do	Volunteer Army four and a half years.
Mrs. A. C. Quackenbush	do	1,000 00	July 1, 1878	Indiana	do	
J. Clinton Robinson	do	1,000 00	Jan 16, 1873	Pennsylvania	do	
Mrs. R. V. Robinson	do	1,000 00	Aug. 1, 1871	Wisconsin	do	
Miss M. M. Wilson	do	1,000 00	Jan. 5, 1875	District of Columbia	do	
Miss Emily Smith	do	1,000 00	Jan. 2, 1873	New Jersey	do	
Miss M. C. Alexander	Clerk, $900 class	900 00	Dec. 6, 1869	West Virginia	do	
Mrs. Ela Benner	do	900 00	Aug. 1, 1879	Pennsylvania	do	
Mrs. L. K. Blount	do	900 00	July 1, 1880	North Carolina	do	
Miss Lillie L. Bull	do	900 00	Jan. 2, 1880	Alabama	do	
Miss M. M. Butler	do	900 00	Jan. 30, 1868	Maryland	do	
Miss Helen Carrier	do	900 00	Mar. 4, 1881	New York	do	
Mrs. A. E. Chapline	do	900 00	Apr. 21, 1874	West Virginia	do	
Mrs. S. E. Churchill	do	900 00	July 20, 1871	Maine	do	

Mrs. H. P. Dame	do	900 00	Aug. 2, 1867	New Hampshire	do		
Mrs C. A. Davis	do	900 00	May 4, 1864	District of Columbia	do		
Mrs. E. Deyber	do	900 00	Oct. 1, 1873	Virginia	do		
Mrs. Kate P. Fuller	do	900 00	May 1, 1878	South Carolina	do		
Miss E. J. Geiger	do	900 00	Sept. 29, 1880	Ohio	do		
Miss Jane W. Gemmell	do	900 00	Sept. 7, 1870	Delaware	do		
Mrs. M. L. Hallett	do	900 00	July 1, 1869	District of Columbia	do		
Mrs. Jennie Harkin	do	900 00	Aug. 2, 1875	New York	do		
Miss M. E. Hart	do	900 00	May 3, 1878	do	do		
Miss M. C. Hayden	do	900 00	July 1, 1873	Vermont	do		
Mrs. M. V. Heath	do	900 00	Nov. 7, 1866	Arkansas	do		
Miss Lizzie S. Henry	do	900 00	Jan. 3, 1871	Iowa	do		
Miss Anna Kalusowski	do	900 00	May 22, 1880	Tennessee	do		
Mrs. H. M. Kelly	do	900 00	June 20, 1867	New Jersey	do		
Miss Annah B. Kidder	do	900 00	May 5, 1880	New York	do		
Mrs. M. J. McBride	do	900 00	June 14, 1877	Mississippi	do		
Mrs. Helen A. McElwain	do	900 00	Dec. 17, 1879	Ohio	do		
Mrs. J. E. Miller	do	900 00	Nov. 16, 1878	do	do		
Mrs. M. A. Millward	do	900 00	Aug. 1, 1880	Kentucky	do		
Miss E. H. Newton	do	900 00	July 1, 1877	California	do		
Mrs. F. E. Norris	do	900 00	Nov. 8, 1879	Alabama	do		
Mrs. Beatrice H. Pope	do	900 00	Mar. 4, 1879	Georgia	do		
Miss Jennie Rabbitt	do	900 00	June 1, 1872	District of Columbia	do		
Miss L. C. Richards	do	900 00	Feb. 10, 1879	Massachusetts	do		
Miss Jeanie Sanders	do	900 00	June 1, 1881	Wisconsin	do		
Mrs. M. E. Seager	do	900 00	July 12, 1880	Indiana	do		
Miss Dora Skeele	do	900 00	Aug. 1, 1880	New York	do		
Miss A. B. Snyder	do	900 00	Nov. 17, 1874	Pennsylvania	do		
Miss Kittie Speer	do	900 00	June 1, 1877	Colorado	do		
Miss Ada Spencer	do	900 00	June 4, 1877	Illinois	do		
Miss Esther S. Spencer	do	900 00	Mar. 1, 1881	Maryland	do		
Miss Adalie Stuart	do	900 00	Aug. 15, 1880	Louisiana	do		
Miss Carrie M. Tilton	do	900 00	Dec. 16, 1880	Iowa	do		
Mrs. Fannie M. Utley	do	900 00	July 1, 1881	North Carolina	do		
Mrs. L. Von Dachenhausen	do	900 00	May 2, 1874	Virginia	do		
Miss Emma O. Waidley	do	900 00	May 1, 1873	Pennsylvania	do		
Miss Marie E. Warde	do	900 00	May 1, 1881	Texas	do		
Miss Nellie F. Warner	do	900 00	Feb. 1, 1878	New York	do		
Miss Clara O. Whittier	do	900 00	May 14, 1864	Maine	do		
Mrs. Kate B. Wood	do	900 00	Apr. 1, 1880	Michigan	do		
Miss Rosa Waters	do	900 00	May 1, 1873	Illinois	do		
Mrs. Maggie W Young	do	900 00	Jan. 3, 1881	Iowa	do		
Richard Bennett	Messenger	840 00	Aug. 3, 1872	New Hampshire	do		Volunteer Army three years.
A. W. Dyson	do	840 00	Apr. 29, 1871	District of Columbia	do		
Richard Green	do	840 00	Feb. 4, 1877	do	Colored		
T. J. Harris	do	840 00	Jan. 1, 1867	do			Volunteer Army nine months.
John T. King	do	840 00	May 21, 1868	do	Colored		Volunteer Army two years.
Isaac F. Norman	do	840 00	July 1, 1879	Ohio	do		
William I. Simpson	do	840 00	Sept. 18, 1874	District of Columbia	White		
John Bell	Assistant messenger	720 00	Apr. 18, 1864	do	Colored		Regular Navy nine years.
Thomas M. Carpenter	do	720 00	June 30, 1879	Missouri	White		Volunteer Army two years.
Hervey E. Clark	do	720 00	Feb. 10, 1880	Iowa	do		

OFFICE OF THE SECRETARY OF THE TREASURY.—Continued.

Name.	Grade.	Compensation.	Date of appointment.	State to which charged.	White or colored.	War record.
Joel G. Floyd	Assistant messenger	$720 00	May 1, 1880	Massachusetts	White	Volunteer Army four years.
William E. Layton	do	720 00	July 31, 1879	New York	do	
Wilson S. Martin	do	720 00	Sept. 22, 1880	Ohio	do	Volunteer Army.
Edward Talbot	do	720 00	Sept. 6, 1870	District of Columbia	do	Volunteer Army four years.
Wilbur S. Iliff	Conductor of elevator	720 00	Feb. 17, 1880	Indiana	do	
Robert H. Wood	do	720 00	Feb. 3, 1881	do	do	
Stephen Allen	Laborer	660 00	Dec. 14, 1871	District of Columbia	Colored	
Lewis Alexander	do	660 00	July 9, 1880	Missouri	do	
Miss A. A. Bottsford	do	660 00	Nov. 16, 1878	District of Columbia	White	
Daniel M. Burke	do	660 00	July 16, 1877	Louisiana	Colored	Volunteer Army one year and six months.
Melvin Butler	do	660 00	Mar. 8, 1880	Minnesota	do	
Edward Chase	do	660 00	June 20, 1877	Tennessee	do	
Mrs. M. Coleman	do	660 00	May 28, 1874	District of Columbia	White	
George Cook	do	660 00	Aug. 1, 1869	do	Colored	
John B. Cornell	do	660 00	July 15, 1880	Virginia	White	
John Costello	do	660 00	June 1, 1881	Illinois	do	
Nero Crawford	do	660 00	July 1, 1879	South Carolina	Colored	Volunteer Army and Navy.
William Davis	do	660 00	Oct. 6, 1873	District of Columbia	do	Volunteer Army.
Andrew Day	do	660 00	May 7, 1877	Mississippi	do	
Walter Dayton	do	660 00	Aug. 3, 1877	Illinois	do	
John I. Dolan	do	660 00	Sept. 24, 1880	Kansas	White	
James P. Elliott	do	660 00	May 17, 1879	Indiana	do	
Mrs. M. J. Flood	do	660 00	Aug. 1, 1878	Michigan	do	
John Fox	do	660 00	June 9, 1880	Virginia	Colored	Volunteer Army one year.
B. J. Gant	do	660 00	Nov. 21, 1866	District of Columbia	do	
Mark N. Garton	do	660 00	Mar. 27, 1875	Virginia	do	
Walter Grandy	do	660 00	Oct. 16, 1880	North Carolina	White	
T. M. W. Green	do	660 00	May 21, 1871	District of Columbia	Colored	
Merrimon Howard	do	660 00	May 7, 1877	Mississippi	do	
Joshua Johnson	do	660 00	Oct. 1, 1881	Texas	do	
William Johnson	do	660 00	Apr. 27, 1869	District of Columbia	do	
Mrs. F. C. Lane	do	660 00	Apr. 20, 1874	New Hampshire	White	
William C. McCauley	do	660 00	Mar. 21, 1881	Colorado	do	Volunteer Army one year.
H. McDermott	do	660 00	July 1, 1868	District of Columbia	do	
Robert H. Mason	do	660 00	Sept. 19, 1881	Georgia	Colored	
Miles Parker	do	660 00	Mar. 14, 1873	District of Columbia	do	
James T. Ralston	do	660 00	Aug. 31, 1880	Illinois	White	
William H. Physic	do	660 00	July 1, 1881	North Carolina	Colored	
Lewis Reeves	do	660 00	Dec. 31, 1879	Virginia	do	
William Rutherford	do	660 00	Oct. 1, 1881	California	White	Volunteer and Regular Army sixteen years.
Charles R. Saxty	do	660 00	Feb. 1, 1878	New York	do	
P. H. Simmons	do	660 00	Mar. 11, 1871	North Carolina	Colored	
W. G. Smith	do	660 00	June 5, 1874	South Carolina	do	
Charles Stewart	do	660 00	Aug. 10, 1870	District of Columbia	do	Volunteer Army one year.

Beverly Tucker	....do		660 00	Oct. 27, 1880	Virginia	....do	Volunteer Army two years and three months.
Mrs. Mary Varnell	....do		660 00	July 1, 1873	District of Columbia	White	
E. Wade	....do		660 00	Aug. 1, 1874	....do	Colored	
Margaret Humphrey	....do	p. d.	1 00	Jan. 6, 1874	....do	....do	
Mrs. M. A. Magruder	....do	p. d.	1 00	Nov. 17, 1873	....do	....do	
Paid from lapse fund.							
James D. Tebault	Clerk, $1,000 class		1,000 00	Dec. 1, 1869	District of Columbia	.. do	Volunteer Army two years.
Mrs. Lillian R. Messenger	Clerk, $900 class		900 00	Aug. 9, 1881	Arkansas	White	
Miss Mary E. McCauley	Laborer		660 00	July 1, 1881	Louisiana	....do	
Mrs. M. M. Frisby	....do		660 00	May 22, 1879	Kansas	....do	
Miss M. L. Vaughn	....do		660 00	Oct. 1, 1881	Ohio	Colored	
Paper room.							
Jacob N. Burket	Superintendent	p. d.	5 00	May 17, 1865	Pennsylvania	White	
Thomas D. Divine	Paper cutter	p. d.	3 00	Jan. 1, 1869	District of Columbia	....do	
Mrs. Emily Henry	Expert	p. d.	2 25	Aug. 6, 1867	....do	....do	
Abram Acwith	Laborer	p. d.	2 00	Feb. 21, 1879	....do	Colored	
Charles B. Fisher	....do	p. d.	2 00	July 19, 1876	....do	....do	Union Navy three years.
Henry Gant	....do	p. d.	2 00	Sept. 21, 1874	....do	....do	
Henry Hopkins	....do	p. d.	2 00	Sept. 14, 1880	....do	White	
William Richardson	....do	p. d.	2 00	Sept. 1, 1874	....do	Colored	Union Army four years.
Bettie Bartlett	Counter	p. d.	2 00	Jan. 17, 1880	....do	White	
Elizabeth Burke	....do	p. d.	2 00	May 4, 1865	....do	....do	
Catherine Hazlett	....do	p. d.	2 00	July 7, 1876	....do	....do	
Jerusha M. Holton	....do	p. d.	2 00	May 17, 1874	Connecticut	.. do	
Esther Jeffries	....do	p. d.	2 00	Sept. —, 1877	Tennessee	...do	
Hattie F. Jones	....do	p. d.	2 00	Oct. 3, 1877	New York	....do	
Lucretia Kleiber	....do	p. d.	2 00	July —, 1869	District of Columbia	...do	
Laura G. Mason	....do	p. d.	2 00	Sept. 1, 1880	Maryland	....do	
Sarah Morrison	....do	p. d.	2 00	Jan. 28, 1881	Pennsylvania	....do	
Ida McKenna	....do	p. d.	2 00	Mar. 21, 1881	District of Columbia	....do	
Florence R. Kelly	....do	p. d.	2 00	July 1, 1881	Pennsylvania	....do	
Florence Oakes	....do	p. d.	2 00	Oct. 22, 1877	Maine	....do	
Ida M. O'Donnell	....do	p. d.	2 00	Aug. 21, 1880	Ohio	....do	
Louise Parlin	....do	p. d.	2 00	May 3, 1878	Missouri	....do	
Mary E. Pinder	....do	p. d.	2 00	July 2, 1877	Massachusetts	....do	
J. R. Rawlings	....do	p. d.	2 00	Feb. 15, 1876	Missouri	....do	
Rose Robinson	....do	p. d.	2 00	Nov. —, 1877	District of Columbia	....do	
Iola Rodier	....do	p. d.	2 00	Jan. 6, 1872	....do	....do	
E. S. West	....do	p. d.	2 00	Aug. 27, 1879	Virginia	....do	
R. A. Yarnell	....do	p. d.	2 00	Oct. 14, 1874	Pennsylvania	....do	
Sarah Carter	Messenger	p. d.	1 50	June 1, 1869	District of Columbia	....do	
*Employed and paid from appropriation for coinage of the standard silver dollar.**							
Eugene B. Adams	Clerk	p. m.	100 00	Oct. 11, 1881			

* Temporary employee, not chargeable to States or Territories under quota law.

OFFICE OF THE SECRETARY OF THE TREASURY—Continued.

Name.	Grade.	Compensation.	Date of appointment.	State to which charged.	White or colored.	War record.
*Employed and paid from the appropriation for custody, care, and protection of land and other property belonging to the United States.**						
Martin L. Noerr	Chief of division	$2,750 00	Dec. 11, 1862	Missouri	White	
George A. Jordon	Clerk	1,800 00	Dec. 24, 1864	Massachusetts	do	Volunteer Army one year.
William A. Fessenden	do	1,800 00	Sept. 24, 1864	Maine	do	Paymaster, U. S. A.
Samuel Knox	do	1,600 00	May 14, 1880	Ohio	do	
John J. Suman	do	1,400 00	Dec. 4, 1880	Maryland	do	Volunteer Army two years.
Mrs. R. V. Robinson	do	1,000 00	Apr. 11, 1871	Wisconsin	do	
George W. Seaver	do	p. m. 75 00	July 12, 1881	Vermont	do	
*Employed and paid from the appropriation for preparation of receipts, expenditures, and appropriations of the government.**						
Ervin W. Bowen	Clerk, class two	1,400 00	Dec. 8, 1880	New York	White	
Delos Lloyd	Clerk, class $1,000	1,000 00	Jan. 5, 1881	Ohio	do	
Miss Clara R. Ramsdell	Clerk, class $900	900 00	Mar. 9, 1881	Indiana	do	
Miss R. E. Kirkwood	do	900 00	May 6, 1881	Maryland	do	
Robert C. Kerstine	Assistant messsenger	720 00	Jan. 21, 1881	Ohio	do	
David E. McElhinney	Laborer	660 00	Feb. 19, 1881	do	do	

OFFICE OF SUPERINTENDENT.

*Paid from appropriation for fuel, lights, and water.**						
James Vermillion	Engineer	$1,400 00	June 29, 1869	District of Columbia	White	Volunteer Army three months.
D. G. Hatch	Storekeeper	1,200 00	Dec. 4, 1875	Kentucky	do	
W. B. Williamson	Machinist	1,200 00	Aug. 22, 1876	Wisconsin	do	Do.
T. A. Gibson	Assistant engineer	1,000 00	Sept. 1, 1879	West Virginia	do	
David Jefferson	Fireman	720 00	Aug. 16, 1870	District of Columbia	Colored	Volunteer Army three years.
John Rush	do	720 00	Oct. 15, 1879	Alabama	White	Volunteer Army during war.
James Waddell	do	720 00	Nov. 10, 1876	Louisiana	do	Volunteer Army three years three months.

Watchmen.						
Harry A. Cobaugh	Captain of watch	1 400 00	July 29, 1870	Pennsylvania	White	Volunteer Army five years and eight months.
James E. Crump	Lieutenant of watch	900 00	July 1, 1871	District of Columbia	do	
William H. Wood	do	900 00	Nov. 9, 1866	California	do	Volunteer Army three years.
Henry A. Allen	Watchman	720 00	July 2, 1873	Maryland	do	Volunteer Army.
William J. Armstrong	do	720 00	Mar. 18, 1880	Kentucky	do	
William W. Armstrong	do	720 00	Oct. 1, 1881	Texas	do	Volunteer Army three months.
Willard Ayers	do	720 00	Apr. 2, 1874	Arkansas	do	
John Bott	do	720 00	Apr. 13, 1869	Missouri	do	Volunteer Army three years and six months.
Henry T. Bragdon	do	720 00	Nov. 22, 1880	Virginia	do	
Robert A. Brown	do	720 00	Jan. 14, 1881	Illinois	do	
Frank W. Carter	do	720 00	Apr. 10, 1878	Louisiana	Colored	
John Carroll	do	720 00	Nov. 23, 1875	New York	White	Volunteer Army four years and eight months.
John Connelly	do	720 00	Jan. 5, 1865	District of Columbia	do	Volunteer Army five years.
John Connerty	do	720 00	Oct. 27, 1880	Louisiana	do	Volunteer Army two years.
Eugene Connor	do	720 00	Apr. 1, 1879	District of Columbia	do	
Charles Davis	do	720 00	July 17, 1876	New Jersey	do	Volunteer Army three months.
Henry Edwards	do	720 00	Apr. 1, 1875	North Carolina	do	Volunteer Navy one year and seven months.
Henry Fetter	do	720 00	Nov. 15, 1870	New Jersey	do	
Woolsey P. Hall	do	720 00	Dec. 11, 1874	Alabama	Colored	
Ross Hamilton	do	720 00	Aug. 7, 1878	Virginia	do	
John H. Hannon	do	720 00	Oct. 15, 1875	North Carolina	do	
William H. H. Hart	do	720 00	Feb. 16, 1869	Georgia	do	
David C. Heiges	do	720 00	Aug. 15, 1880	Pennsylvania	White	Volunteer Army.
William Hill	do	720 00	Sept. 16, 1874	District of Columbia	do	
William H. Hill	do	720 00	Sept. 10, 1870	Pennsylvania	do	Volunteer Army three years and three months.
F. A. Hopping	do	720 00	June 1, 1881	Missouri	do	Volunteer Army three and a-half years.
George H. Jackson	do	720 00	Nov. 4, 1875	Vermont	do	Volunteer Army three years.
Daniel T. Johnson	do	720 00	Mar. 20, 1871	District of Columbia	do	
Thomas M. Johnson	do	720 00	Aug. 2, 1875	North Carolina	Colored	
John H. Kelley	do	720 00	Apr. 21, 1876	Illinois	White	
William J. Kline	do	720 00	Sept. 11, 1880	do	do	
Thomas R. W. King	do	720 00	June 1, 1881	Arkansas	do	
F. R. Koester	do	720 00	Feb. 3, 1879	New York	do	Volunteer Army two years.
A. L. Lewis	do	720 00	Aug. 20, 1880	Virginia	do	
H. H. Mason	do	720 00	July 28, 1881	Illinois	do	Volunteer Army three years.
Roger McBride	do	720 00	Nov. 10, 1877	Arkansas	do	Volunteer Army five years.
George McGoines	do	720 00	Dec. 1, 1872	Pennsylvania	Colored	
John McGuire	do	720 00	June 30, 1864	District of Columbia	White	
[illegible] Meade	do	720 00	May 12, 1879	New Jersey	do	
Richard Michael	do	720 00	Oct. 1, 1874	Maryland	do	Volunteer Army ten months.
Edward S. Moran	do	720 00	July 30, 1874	District of Columbia	do	
J. F. Molleré	do	720 00	Aug. 1, 1879	Louisiana	do	
Edward Odam	do	720 00	Jan. 30, 1874	Alabama	Colored	
A. W. Rose	do	720 00	Apr. 1, 1879	Tennessee	White	Volunteer Army two years and seven months.
Emil Schubert	do	720 00	May 1, 1876	District of Columbia	do	Volunteer Army three years.
John A. Sharpe	do	720 00	Aug. 19, 1879	New Jersey	do	Volunteer Army one year and seven months.
William H. Schelley	do	720 00	Feb. 16, 1878	Ohio	do	Volunteer Army two years and nine months.
John B. Simmons	do	720 00	Jan. 1, 1879	Rhode Island	do	Volunteer Army three years.
Butler Speare	do	720 00	July 7, 1881	South Carolina	Colored	

* Not chargeable to States or Territories under quota law.

OFFICE OF SUPERINTENDENT—Continued.

Name.	Grade.	Compensation.	Date of appointment.	State to which charged.	White or colored.	War record.
Albert N. Stevenson	Watchman	720 00	Apr. 21, 1880	New Jersey	White	Volunteer Army three years.
Patrick Sullivan	do	$720 00	July 1, 1878	Wisconsin	White	Volunteer Army one year and four months.
J. B. Taylor	do	720 00	Sept. 10, 1878	Illinois	do	Volunteer Army three years.
John G. Toepper	do	720 00	Sept. 17, 1880	Pennsylvania	do	Volunteer Army one year and five months.
Moses Towle	do	720 00	Aug. 18, 1880	California	do	
James H. Upperman	do	720 00	Aug. 1, 1880	North Carolina	do	
William C. Watson	do	720 00	Apr. 1, 1880	Delaware	do	Volunteer Army three years.
George W. Weed	do	720 00	Aug. 1, 1878	Kansas	do	Volunteer Army four years.
John Williams	do	720 00	July 21, 1877	Mississippi	do	Volunteer Army three years.
Robert G. Wilson	do	720 00	Apr. 1, 1876	California	do	Volunteer Army five years.
Foster P. Wood	do	720 00	June 21, 1877	Michigan	do	Volunteer Army three years.
*Charwomen.**						
Margaret Bond	Charwoman	180 00			Colored	
Lydia Beatar	do	180 00			White	
Ellen Bell	do	180 00			Colored	
Anna Bean	do	180 00			White	
Ann Boylan	do	180 00			do	
Susan Barnett	do	180 00			Colored	
Anna Belt	do	180 00			White	
Mary Brown	do	180 00			do	
Hannah Blackford	do	180 00			Colored	
Maria Boston	do	180 00			do	
Adele Becket	do	180 00			do	
Winnie Caulfield	do	180 00			White	
Georgiana Colder	do	180 00			Colored	
Mary Coquire	do	180 00			do	
Lizzie Crowther	do	180 00			White	
Bridget Cannon	do	180 00			do	
Kate Cassidy	do	180 00			do	
Mary Castello	do	180 00			do	
Jane Dailey	do	180 00			do	
Ann Donevan	do	180 00			do	
Victoria Edmondson	do	180 00			do	
Eliza Furtner	do	180 00			do	
Charlotte Fahrenbuck	do	180 00			do	
Anna Fontler	do	180 00			do	
Johanna Fitzgerald	do	180 00			do	
Elizabeth Guion	do	180 00			do	
Fannie Gray	do	180 00			Colored	
Kate Hanney	do	180 00			White	
Caroline Hager	do	180 00			do	
Anna Hurdle	do	180 00			do	
Martha Hudson	do	180 00			do	

Mary Hudson	do		180	00		do	
Anna Hessa	do		180	00		do	
Mary Holtzman	do		180	00		do	
Clara Haberman	do		180	00		do	
Catherine Hines	do		180	00		do	
Jane Hurbert	do		180	00		do	
Virginia Johnson	do		180	00		Colored	
Alice Jones	do		180	00		White	
Sarah Johnson	do		180	00		Colored	
Louise Keppler	do		180	00		White	
Elizabeth Keef	do		180	00		do	
Elizabeth Keese	do		180	00		do	
Antonia Killian	do		180	00		do	
Lillie Kelly	do		180	00		do	
Margaret Linkins	do		180	00		do	
Fannie Matthews	do		180	00		Colored	
Mary Moran	do		180	00		White	
Elizabeth Moody	do		180	00		do	
Mary McNalley	do		180	00		do	
Mary McNanny	do		180	00		do	
Fannie McCrystal	do		180	00		do	
Julia O'Hara	do		180	00		do	
Christina Phluger	do		180	00		do	
Harriet Richardson	do		180	00		Colored	
Susan Reed	do		180	00		White	
Martha Robinson	do		180	00		do	
Mary Radcliffe	do		180	00		do	
Rebecca Rowlett	do		180	00		do	
Mary Simpson	do		180	00		Colored	
Sarah Smith	do		180	00		White	
Kate Spangler	do		180	00		do	
Johanna Stack	do		180	00		do	
Anna Shakespeare	do		180	00		do	
Bridget Smith	do		180	00		do	
Mary Slingland	do		180	00		do	
Maggie Thompson	do		180	00		do	
Sarah Thomas	do		180	00		do	
Jane Thomas	do		180	00		do	
Nora Tennant	do		180	00		do	
Elizabeth Vermillion	do		180	00		do	
Hattie Williams	do		180	00		do	
Francis Woods	do		180	00		do	
Anna Welch	do		180	00		do	
Charlotte Young	do		180	00		Colored	
*Temporary emyloyés paid from appropriation fuel, lights, and water.**							
Reuben H. Andrews	erk	p. d.	6	00	Aug. 31, 1877		White
Frank L Sanford	do	p. d.	5	00	July 16, 1877		do

* Temporary employees, not chargeable to States or Territories under quota law.

OFFICE OF SUPERINTENDENT—Continued.

Name.	Grade.	Compensation.	Date of appointment.	State to which charged.	White or colored.	War record.
Samuel M. Fassett	Clerk	$1,200 00	Jan. 12, 1880		White	
Charles R. Hyde	do	p. d. 4 00	Jan. 7, 1879		do	
Frank C. Harris	do	1,400 00	July 2, 1880		do	
Harry Lyons	do	p. d. 3 00	June 1, 1872		do	
Augustus S. McElhone	do	p. m. 75 00	Feb. 4, 1878		do	
J. R. McGregor	do	p. d. 4 00	Mar. 28, 1878		do	
Stephen D. Skeen	Foreman of laborers	1,200 00	July 1, 1879		do	Volunteer Army three years.
*Paid from appropriation furniture and repairs of furniture.**						
Frank J. Hessler	Foreman cabinet-shop	p. d. 5 00			White	
J. A. Degges	Special inspector of furniture	p. d. 5 00			do	Volunteer Army.
P. N. Dwyer	Draughtsman	p. d. 4 00			do	
G. W. Donn, jr	Cabinet-maker	p. d. 3 00			do	Three months District Columbia militia.
John F. Degges	do	p. d. 3 00			do	
F. A. Isphording	do	p. d. 3 00			do	Volunteer Army three years two months.
J. M. Judge	Clerk	1,000 00			do	
J. W. Kemp	Cabinet-maker	p. d. 3 50			do	
John Lehnert	Helper	p. m. 60 00			do	Volunteer Army three years.
Thomas H. Paul	Cabinet-maker	p. d. 3 00			do	
W. G. Phillips	do	p. d. 3 00			do	Volunteer Army three and a half months.
G. Rowzee	do	p. d. 3 00			do	
Richard Ryan	do	p. d. 3 00			do	
J. A. Rodbird	do	p. d. 3 00			do	
Julius Viedt	do	p. d. 3 00			do	Volunteer Army one year seven months.
C. J. Woodward	do	p. d. 3 00			do	
*Paid from appropriation expenses collecting revenue from customs.**						
Daniel S. Foster	Fourth class	1,800 00	Sept. 12, 1865	Pennsylvania	White	5th Pa. Vols., two years, wounded.
William A. Gatley	do	1,800 00	June 2, 1871	District of Columbia	do	Nearly seven years, United States Army.
H. L. Shepard	do	1,800 00	Sept. 9, 1865	Massachusetts	do	1st Mass. Vols. (Cav.), four years, wounded.
R. B. Taylor	do	1,800 00	May 10, 1864	District of Columbia	do	10th Mass. Vols., one year, wounded.
W. C. Bickford	Third class	1,600 00	Feb. 1, 1867	Maine	do	16th Me. Vols., four years and four months, wounded, and V. R. C.
James T. Hall	do	1,600 00	Nov. 27, 1863	Indiana	do	
B. T. Spencer	Second class	1,400 00	July 25, 1867	District of Columbia	do	16th Ill. Vols., 18 months.
F. J. Young	do	1,400 00	Aug. 14, 1878	Illinois	do	2d Ill. Vol. Art., 20 months.
George L. Clark	First class	1,200 00	Sept. 6, 1881	Massachusetts	do	40th Mass. Vols., three years.
E. A. Goodwin	do	1,200 00	Aug. 4, 1877	Alabama	do	

F. E. Johnson	....do	1,200 00	Mar. 11, 1871	Virginia	... do	
Charles H. Smith	....do	1,200 00	Mar. 21, 1871	New York	....do	76th N. Y. Vols, three years, wounded.
E. L. Kimball	Clerk	p. d. 8 00	Dec. 15, 1865	District of Columbia	.. do	Two years nine months, Reg. Army.
Joseph T. Little	....do	p. d. 5 00		Illinois	....do	
Lewis Aldridge	Messenger	p. m. 40 00	June 5, 1881	District of Columbia	Colored	
George W. Butler	....do	840 00	Mar. 11, 1871	Maryland	....do	
R. W. Davidge	....do	840 00	Feb. 24, 1872	Massachusetts	....do	
Richard Henderson	....do	840 00	Apr. 1, 1870	Maryland	.. do	
Edward Hubbard	....do	840 00	Aug. 5, 1870	New York	... do	
W. D. Ritner	....do	720 00	Feb. 1, 1881	Kansas	White	
*Paid from appropriation contingent expenses Treasury Department.**						
Moses Davis	Gardner	1,200 00			White	
John A. Borland	Laborer	p. m. 50 00			....do	
Godfrey Beck	....do	p. m. 70 00			....do	Army.
Mrs. Bertha Brandt	Waste paper assorter	p. m. 30 00			....do	
William C. Coates	Laborer	p. m. 50 00			Colored	
C. C. Chew	Fireman	p. m. 60 00			White	
David A. Clark	Laborer	p. m. 55 00			Colored	
John Driscoll	....do	p. m. 30 00			White	
Charles Johnson	....do	p. m. 50 00			Colored	Volunteer Army three years.
J. E. Johnson	....do	p. m. 50 00			.. do	
Emma Lane	Waste paper assorter	p. m. 30 00			White	
Lizzie McCullip	....do	p. m. 30 00			....do	
J. G. McComb	Laborer	p. m. 50 00			....do	Volunteer Army three years.
Henson Makal	....do	p. m. 50 00			Colored	
William Mitchell	... do	p. m. 50 00			....do	
Silas Trunnel	Carpenter Second Auditor's Office	p. m. 55 00			White	Army.
John Sanders	Laborer	p. m. 30 00			Colored	
Joseph Williams	....do	p. m. 50 00			White	
James E. Woodruff	Elevator tender	p. m. 60 00			....do	
*Paid from appropriation labor and expenses engraving and printing.**						
J. K. Miller	Engineer at macerator	p. d. 3 00			White	39th Wis. Vols., during service of regiment.
L. J. Garner	Fireman at macerator	p. d. 2 00			....do	

BUREAU OF THE MINT.

R. E. Preston	Examiner	$2,300 00	Apr. 1, 1856	Tennessee	White	
Frederick Eckfeldt	Computer	2,200 00	Apr. 16, 1875	Pennsylvania	....do	Volunteer Army.
W. P. Laroon	Assayer	2,200 00	Feb. 15, 1876	Illinois	....do	
E. O. Leech	Adjuster accounts	2,000 00	July 23, 1869	District of Columbia	....do	
W. F. Harvey	Clerk third class	1,600 00	Oct. 18, 1871	Vermont	....do	

* Temporary employés, not chargeable to States or Territories under quota law.

BUREAU OF STATISTICS—Continued.

Name.	Grade.	Compensation.	Date of appointment.	State to which charged.	White or colored.	War record.
F. P. Gross	Clerk second class	$1,400 00	July 1, 1880	Kentucky	White	Volunteer Army.
A. A. Hasson	Clerk first class	1,200 00	Nov. 15, 1872	Pennsylvania	do	
Eugene McSwyny*	Clerk	1,000 00	Aug. 21, 1880	Missouri	do	Volunteer Army.
S. M. Landon	Copyist	900 00	Feb. 1, 1875	Vermont	do	
Abbu B. Clark*	do	900 00	July 1, 1881	Georgia	do	
Thomas D. Smith	Messenger	840 00	July 6, 1873	Virginia	Colored	Volunteer Army.
W. H. Ferguson	Laborer	660 00	July 1, 1881	Alabama	do	

BUREAU OF STATISTICS.

Joseph Nimmo, jr	Chief of bureau	$3,000	July 1, 1875	New York	White	
Joseph N. Whitney	Chief clerk	2,000	June 14, 1865	Maine	do	Volunteer Army three years.
Lucien J. Barnes	Fourth class	1,800	Apr. 25, 1875	Arkansas	do	Volunteer Army two years and seven months.
William Burchard	do	1,800	Oct. 7, 1869	District of Columbia	do	Volunteer Army four years.
J. D. O'Connell	do	1,800	Nov. 9, 1866	New York	do	Volunteer Army one year and ten months.
James Ryan	do	1,800	June 8, 1866	District of Columbia	do	
Charles H. Evans	Third class	1,600	July 19, 1865	Maryland	do	Volunteer Army three years.
August Hoester	do	1,600	Aug. 2, 1869	District of Columbia	do	Volunteer Army four years.
Emil J. Keferstein	Third class	1,600	Sept. 3, 1869	District of Columbia	White	Volunteer Army two years.
John B. Parker	do	1,600	July 28, 1867	Vermont	do	
Benjamin T. Welch	do	1,600	Jan. 16, 1874	Maryland	do	
James F. Bolton	Second class	1,400	Dec. 23, 1868	Vermont	do	During the war in Volunteer Army.
Max Galody	do	1,400	Aug. 20, 1869	Rhode Island	do	
Charles Stratton	do	1,400	Oct. 11, 1871	Pennsylvania	do	Volunteer Army four years.
George H. Thomson	do	1,400	Oct. 1, 1879	Ohio	do	
Lorenzo Vanderhoef	do	1,400	Aug. 1, 1877	Michigan	do	Volunteer Army two years.
Milton P. Caldwell	First class	1,200	Dec. 22, 1880	Georgia	do	
Paul Clendenin	do	1,200	Jan. 2, 1880	Illinois	do	
Sheridan B. Galloway	do	1,200	July 9, 1880	do	do	
Maurice F. Pilgrim	do	1,200	Dec. 16, 1880	New Jersey	do	
Ernest M. Rosafy	do	1,200	June 1, 1881	North Carolina	do	
Stephen C. Stowell	do	1,200	Apr. 5, 1876	Arkansas	do	
Walter S. Evans	Clerk	1,000	May 16, 1881	Illinois	do	Volunteer Army one year and six months.
William H. Norton	do	1,000	July 1, 1880	Ohio	do	Volunteer Army four years and six months.
Miss Mary A. Spencer	do	1,000	May 4, 1864	District of Columbia	do	
Miss Nancy D. Bishop	Copyist	900	Mar. 1, 1869	Pennsylvania	do	
Miss Kate G. Crane	do	900	Aug., 1869	Massachusetts	do	
Mrs. Laura A. Dyer	do	900	May 7, 1875	Maine	do	
Miss Mary A. McMakin	do	900	July 1, 1873	Pennsylvania	do	
Miss Hattie F. Wyman	do	900	Jan. 7, 1871	do	do	
John W. Ewing	Assistant messenger	720	Dec. 1, 1877	Tennessee	Colored	
Frederick F. Howard	Laborer	660	May 1, 1879	New York	White	

Miss Clementine Bartlett	....do	480	Oct. 1, 1881	Virginia	Colored	
Employed under provisions of act of March 3, 1875, relating to statistics of internal and foreign commerce.						
John P. Anderson	First class	1,200	Jan. 5, 1876	Ohio	White	
John A. Rowland	....do	1,200	Dec. 4, 1876	District of Columbia	....do	
George W. Leesnitzer	....do	1,200	Nov. 28, 1879	....do	....do	
Charles M. Brown	Clerk	$100 month	Feb. 25, 1881	Ohio	....do	
Spencer Murray, jr	Assistant messenger	840	Sept. 15, 1875	Maryland	Colored	

LIFE-SAVING SERVICE.

William D. O'Connor	Assistant superintendent	$2,500	Oct. 18, 1861	Massachusetts	White	
Albert M. Read	Principal clerk and accountant	1,800	Feb. 1, 1866	Michigan	....do	Volunteer Army one year and six months.
David T. Jones	Third class clerk	1,600	Mar. 13, 1876	Illinois	....do	
Elbridge J. Pattee	....do	1,600	May 18, 1870	Maine	....do	Volunteer Army two years and nine months.
Edward W. Creecy	Second class clerk	1,400	May 1, 1878	Mississippi	... do	Volunteer Navy two years and six months.
John J. Miller	First class clerk	1,200	Oct. 8, 1875	Pennsylvania	....do	
Alonzo J. Downing	....do	1,200	Oct. 1, 1875	Virginia	... do	
Arthur H. Baker	....do	1,200	July 1, 1881	Minnesota	....do	
Mrs. Sarah M. McDonald	$1,000 class clerk	1,000	Nov. 13, 1877	Mississippi	....do	
Mrs. Anna W. Thomas	....do	1,000	June 26, 1879	....do	....do	
Miss Rebecca A. Martin	$900 class clerk	900	June 26, 1879	Virginia	....do	
Miss Margaret Hawes	....do	900	June 25, 1879	Kentucky	....do	
Mrs. Hannah McL. Shepard	....do	900	June 23, 1879	Wisconsin	....do	
Mrs. Eleanor M. Converse	....do	900	Feb. 1, 1881	Massachusetts	....do	
John H. Madella	Assistant messenger	720	July 1, 1877	Virginia	Colored	
Oliver White	Laborer	660	Oct. 6, 1880	Georgia	....do	

OFFICE LIGHT-HOUSE BOARD.

A. B. Johnson	Chief clerk	$2,400 00	Mar. 20, 1861	Massachusetts	White	
Frank Baker	Clerk	1,800 00	Aug. 7, 1868	New York	....do	Volunteer Army three years.
E. P. Rankin	....do	1,800 00	May 19, 1871	Michigan	....do	
W. A. Gwyer	....do	1,600 00	May 14, 1874	Nebraska	....do	
S. L. Norton	....do	1,600 00	Nov. 7, 1871	New York	....do	
J. C. Nash	....do	1,400 00	Jan. 2, 1877	Tennessee	....do	
L. H. Ranney	....do	1,200 00	Oct. 4, 1862	District of Columbia	....do	
G. C. Mulliken	....do	1,200 00	Dec. 4, 1876	Nebraska	....do	
Mrs. E. J. Beare	....do	900 00	Apr. 28, 1868	District of Columbia	....do	
Gurdon Snowden	Assistant messenger	720 00	——, 1861	... do	Colored	
Mrs. Anna A. Gillmore	Laborer	660 00	July 1, 1881	Indiana	White	
Miss Mary V. Scott	....do	660 00	July 1, 1881	Kansas	....do	

* Temporarily employed and paid from lapse fund.

OFFICE LIGHT-HOUSE BOARD—Continued.

Name.	Grade.	Compensation.	Date of appointment.	State to which charged.	White or colored.	War record.
Colbert Syphax	Laborer	$660 00	Sept. 22, 1863 Date of employment.	District of Columbia	Colored	
E. D. Easton	Writer	1,400 00	Sept. 14, 1874	Massachusetts	White	
L. F. W. Cushing	do	1,200 00	Jan. 19, 1878	do	do	Volunteer Army four years.
Mrs. H. J. Kiernan	do	1,200 00	Nov. 30, 1877	New York	do	
Miss C. A. Burghardt	do	900 00	July 16, 1875	do	do	
Miss M. Brandt	do	900 00	Nov. 20, 1875	Maryland	do	
Miss R. L. Bleecker	do	900 00	May 19, 1880	New York	do	
Miss F. Cassel	do	900 00	Mar. 7, 1876	Ohio	do	
Mrs. C. Collins	do	900 00	June 5, 1876	Maryland	do	
Miss E. Donaldson	do	900 00	Nov. 30, 1877	do	do	
Miss S. D. Jackson	do	900 00	Jan. 15, 1878	do	do	
Miss M. C. Jones	do	900 00	Oct. 5, 1875	Virginia	do	
Mrs. L. H. Jones	do	900 00	Nov. 17, 1875	Pennsylvania	do	
Miss M. McLeod	do	900 00	Jan. 15, 1878	do	do	
Miss E. Robinson	do	900 00	Mar. 1, 1881	Connecticut	do	
Miss A. E. Taylor	do	900 00	Nov. 30, 1877	Pennsylvania	do	
Miss E. L. Tilton	do	900 00	Dec. 1, 1875	Maryland	do	
Mrs. M. A. Tress	Messenger	p. m. 60 00	May 16, 1877	do	do	
Albert Hopkins	Laborer	p. d. 2 00	Aug. 10, 1874	Virginia	Colored	
Paul J. Pelz	Assistant civil engineer	p. m. $200 00	Apr. 4, 1868	New Jersey	White	
Victor Hagman	Draughtsman	p. m. 150 00	Feb. 14, 1873	Pennsylvania	do	Volunteer Army seventeen months.
Ferdinand Theilkuhl	do	p. m. 140 00	Aug. 12, 1872	District of Columbia	do	Volunteer Army 1861 to 1865.
Jacob Jose	do	p. m. 140 00	July 1, 1872	New York	do	
J. W. Wagner	do	p. m. 110 00	July 21, 1877	District of Columbia	do	
Max Hausman	do	p. m. 100 00	Jan. 4, 1875	do	do	

OFFICE OF THE SUPERVISING SURGEON-GENERAL UNITED STATES MARINE HOSPITAL SERNICE.

			Date of appointment.			
George W. Collison	Clerk	$1,600 00	Apr. 8, 1879	Colorado	White	
George A. Gustin	do	1,600 00	Apr. 1, 1881	Georgia	do	
James V. Logan	do	1,600 00	Feb. 8, 1877	Illinois	do	
John McLean	do	1,600 00	May 18, 1877	do	do	
William S. Parks	do	1,600 00	July 5, 1877	Ohio	do	
John C. Rowland	do	1,600 00	May 24, 1877	Pennsylvania	do	
William P. Worcester	do	1,600 00	May 13, 1879	Illinois	do	Volunteer Army three years.
Mrs. Emma H. Griffin	do	1,200 00	Mar. 20, 1879	do	do	
Mrs. Mary P. Culver	Copyist	900 00	Apr. 8, 1879	Arkansas	do	
Mrs. Jennie S. Matthews	do	900 00	Apr. 1, 1881	New York	do	

M. Adele L. Scott	....do		900 00	Apr. 1, 1881	Ohio	....do	
Alexander Simon	....do		900 00	July 16, 1879	do	....do	
Henry Gahn	Steward		960 00	Apr. 10, 1878	Pennsylvania	....do	
Henry Ellis	Laborer	p. m.	20 00	July 1, 1880	District of Columbia	Colored	
John Lewis	....do	p. m.	40 00	Jan. 23, 1879	... do	....do	
Theodore Williams	....do	p. m.	40 00	June 12, 1877	....do	....do	
BUREAU OF ENGRAVING AND PRINTING.							
O. H. Irish	Chief		$4,500 00	May 1, 1877	Nebraska	White	
Daniel W. Wilson	Assistant chief		2,250 00	May 1, 1877	Ohio	....do	Volunteer Army four years.
Thomas J. Sullivan	Accountant		2,000 00	Dec. 1, 1869	District of Columbia	....do	
Samuel W. Curriden	Stenographer		1,600 00	June 29, 1874	Pennsylvania	....do	
Annie M. Hayes	Clerk		1,600 00	Dec. 15, 1863	Virginia	....do	
William I. Sherwood	....do		1,400 00	Jan. 28, 1876	New York	....do	
Frederick Mohl	....do		1,200 00	Jan. 10, 1879	Texas	....do	
Omer V. Cole	....do		1,200 00	July 7, 1880	Ohio	....do	
Horace H. Durant	....do		1,200 00	May 17, 1880	... do	....do	
Mary B. Taylor	....do		1,200 00	Mar. 23, 1863	District of Columbia	....do	
Rachael Dodson	....do		1,000 00	Apr. 20, 1874	Ohio	....do	
Dicandia D. Costigan	Copyist		900 00	Feb. 5, 1873	Maryland	....do	
Emma L. Johns	....do		900 00	Oct. 4, 1872	Pennsylvania	....do	
Eliza A. Johnson	....do		900 00	Dec. —, 1869	New York	....do	
Louis A. Cornish	Assistant messenger		720 00	Aug. 23, 1871	District of Columbia	Colored	Volunteer Navy three and one-half years.
Aaron Russell	....do		720 00	May 10, 1877	....do	....do	
Ephraim E. Jackson	Laborer		660 00	June —, 1877	South Carolina	....do	
Stephen Johnson	....do		660 00	July 23, 1877	Nebraska	....do	
William Washington	....do		660 00	Dec. —, 1873	New York	....do	
William L. Waller	....do		660 00	July 10, 1880	Pennsylvania	White	
*Engraving Division.**							
George W. Casilear	Superintendent		5,000 00	Dec. 1, 1862	New York	White	
Charles E. McNabb	Clerk	p. d.	3 00	Mar. 5, 1879	District of Columbia	....do	
David M. Cooper	Engraver	p. d.	8 75	Feb. 1, 1867	New York	....do	
William A. Copenhaver	....do	p. d.	5 00	July 1, 1875	....do	....do	
William H. Earle	....do	p. d.	8 00	Jan. 2, 1866	Pennsylvania	....do	
Lorenzo J. Hatch	....do	p. d.	7 50	Apr. —, 1874	Vermont	....do	
John F. E. Prud'homme	....do	p. d.	8 75	June 1, 1869	New York	....do	
Jacob Hyatt	....do	p. d.	6 00	Feb. —, 1869	....do	....do	
Francis H. Noyes	....do	p. d.	4 50	Sept. 25, 1876	District of Columbia	....do	
George A. Abbott	Transferrer	p. d.	6 50	Oct. 14, 1869	New Hampshire	....do	
Robert Gillham	....do	p. d.	6 50	Oct. —, 1863	Massachusetts	....do	
Edward C. Kittle	....do	p. d.	6 50	Nov. —, 1863	New Jersey	....do	61st New York State Volunteers.
Alvin N. Meeker	....do	p. d.	6 50	Mar. 9, 1867	New York	....do	
Edward Shaffer	....do	p. d.	7 00	Aug. —, 1869	....do	....do	
George W. Tichenor	....do	p. d.	6 50	Aug. —, 1872	....do	....do	
George Wright	....do	p. d.	6 50	Mar. —, 1873	New Jersey	....do	
Samuel D. O'Brien	Prover	p. d.	5 00	Nov. —, 1866	New York	....do	

* The employés in the Bureau of Engraving and Printing from this point forward are not chargeable to States or Territories under the quota law.

BUREAU OF ENGRAVING AND PRINTING—Continued.

Name.	Grade.	Compensation.	Date of appointment.	State to which charged.	White or colored.	War record.
William W. Ryan	Prover	p. d. $5 00	Nov. —, 1863	New York	White	12th New York State National Guard.
Charles D. Knight	Plate-cleaner	p. d. 4 50	June —, 1866	District of Columbia	do	
Anton C. Paquet	Die-sinker	p. d. 5 00	Oct. 29, 1878	Pennsylvania	do	
George A. Bell	Machinist	p. d. 3 00	Nov. —, 1864	District of Columbia	do	District Volunteers.
Sophia S. Bootes	Expert	p. d. 2 00	Oct. 23, 1878	do	do	
Lilly A. Chester	Clerk	p. d. 2 00	Aug. 13, 1880	do	do	
John O'Leary	Helper	p. d. 2 50	June —, 1864	do	do	
Michael Morgan	do	p. d. 2 00	Dec. 20, 1878	Connecticut	do	
Lloyd B. Brooke	Assistant distributer of stock	p. d. 3 00	Sept. 16, 1872	Maryland	do	
Walter Doxon	Apprentice	p. d. 2 50	Oct. 8, 1878	District of Columbia	do	
Alvin D. Whittington	do	p. d. 3 00	Jan. 15, 1878	do	do	
G. Adolph Erni	do	p. d. 2 50	Jan. 4, 1879	Tennessee	do	
Edward McC. Hall	do	p. d. 2 00	Jan. 3, 1879	District of Columbia	do	
Charles F. Jarvis	Plate-cleaner	p. d. 3 00	Oct. 1, 1879	do	do	
George A. Mason	Transferrer	p d. 4 50	June 21, 1875	New York	do	
Milton L. Stewart	Messenger	p. d. 1 50	July 7, 1881	District of Columbia	Colored	
Custodian of Plates, &c.						
George S. Bell	Custodian	p. d. 6 50	May 2, 1878	Ohio	White	
Charles G. Evans	Assistant custodian	p. d. 5 00	—— —, 1862	Pennsylvania	do	
John A. Webster	do	p. d. 5 00	Apr. 24, 1876	Massachusetts	do	
Walter T. Saunders	Distributer of stock	p. d. 3 00	July 13, 1874	Virginia	do	
Tyler Williams	Clerk	p. d. 3 00	Nov. 13, 1877	District of Columbia	do	
Vault.						
James W. Moore	Vault-keeper	p. d. 6 00	Oct. 25, 1877	Nebraska	White	
Joseph H. Hartley	Assistant vault-keeper	p. d. 3 00	Dec. 22, 1872	Pennsylvania	do	United States Marine Corps four years.
Emeline A. Fister	Clerk	p. d. 2 00	Oct. —, 1869	District of Columbia	do	
Miles C. Maxfield	Helper	p. d. 2 00	June 8, 1878	do	Colored	
William H. Hood	do	p. d. 1 50	Apr. 25, 1879	New York	White	
Henry T. Johnson	do	p. d. 1 50	June 28, 1880	District of Columbia	Colored	
Christopher C. Whitehurst	do	p. d. 1 50	July 27, 1881	Georgia	do	
Lee Press.						
Homer Lee	Superintendent	p. d. 5 00	Aug. 2, 1881	New York	White	
Charles M. Korn	Alternate	p. d. 5 00	Aug. 2, 1881	do	do	
M. Degere	Assistant	p. d. 1 25	Aug. 10, 1881	do	do	
Marie Laignel	do	p. d. 1 25	Aug. 13, 1881	District of Columbia	do	
Wetting Branch.						
Owen T. Edgar	Foreman	p. d. 5 00	Apr. —, 1864	Pennsylvania	White	

Kate E. Westhorpe	Clerk in charge of allotments	p. d.	2 50	Oct. —, 1869	Iowa	....do	
Benjamin L. Fairchild	Clerk	p. d.	2 00	Jan. 14, 1879	New York	....do	
William T. Lemsford	.....do	p. d.	3 50	Oct. 21, 1873	District of Columbia	....do	
Frank W. Larner	.....do	p. d.	1 50	July 6, 1881	....do	....do	
Bessie Vanderpoel	.....do	p. d.	2 00	Sept. 17, 1872	New York	....do	
Eliza W. Angel	Counter	p. d.	1 50	Nov. 22, 1875	Maryland	... do	
John H. Brooks	Helper	p. d.	2 00	Apr. 17, 1873	....do	Colored...	Volunteer Army three years.
Henry Cox	.....do	p. d.	1 50	July 19, 1880	Virginia	... do	
Albert N. Dewey	.....do	p. d.	2 00	Aug. 18, 1879	District of Columbia	White	
James B. Faulkner	.....do	p. d.	3 00	Jan. 1, 1869	....do	....do	District Volunteers.
William H. Jett	.....do	p. d.	3 00	Nov. —, 1869	....do	....do	Served in Navy.
John A. Green	.....do	p. d.	1 50	Aug. 20, 1874	.. do	Colored...	Volunteer Army.
James C. Perrie	.....do	p. d.	2 00	July 6, 1880	....do	....do	
William R. Reapsomer	.....do	p. d.	1 50	Jan. 8, 1881	Maryland	... do	
George F. Redman	.....do	p. d.	1 00	Feb. 16, 1880	District of Columbia	White	
Chester H. Henderson	Boy	p. d.	1 00	Aug. 24, 1877	Illinois	....do	
George W. Hollinberger	.....do	p. d.	1 00	Oct. 1, 1881	District of Columbia	....do	
Robert J. Laurenson	.....do	p. d.	1 00	June 16, 1879	....do	....do	
Willett J. Indermauer	.....do	p. d.	1 00	Oct. 13, 1879	....do	....do	
John H. Hammond	.....do	p. d.	50	Sept. 14, 1881	Ohio	....do	
Adolphus Lipphard	.....do	p. d.	1 00	Oct. 17, 1881	District of Columbia	....do	
Edward E. Myers	.....do	p. d.	50	Jan. 25, 1881	....do	....do	
Laurence J. McHugh	.....do	p. d.	1 00	July 6, 1881	....do	....do	
George A. McLaughlin	.....do	p. d.	1 00	Feb. 7, 1881	....do	....do	
Augustus Smith	.....do	p. d.	1 00	Apr. 26, 1880	Virginia	....do	
William B. Yeatman	.....do	p. d.	1 00	Sept. 16, 1881	District of Columbia	....do	
Anna B. Adams	Counter	Piece-rates.		Mar. 8, 1879	... do	... do	
Annie Andrews	.....do	....do		Nov. 2, 1872	....do	....do	
Susie L. Beaton	.....do	....do		May 5, 1879	....do	....do	
Celestia Gault	.....do	....do		Aug. 26, 1880	Maryland	....do	
Emma A. Hodges	.....do	....do		July 27, 1878	District of Columbia	....do	
Sarah V. Keenan	.....do	....do		July 21, 1880	....do	... do	
Eva H. Marks	.....do	....do		June 2, 1879	....do	....do	
Mary Mason	.....do	....do		July 20, 1881	....do	....do	
Frank M. Costello	Division clerk	p. d.	1 50	July 10, 1879	... do	....do	
William O'Gladman	Laborer	p. d.	1 50	Sept. 1, 1879	....do	....do	
Laurence Murphy	.....do	p. d.	1 50	Jan. 4, 1881	....do	....do	
Millard F. Singleton	Messenger	p. d.	1 50	July 8, 1880	Virginia	Colored...	
Charles F. Josetti	.....do	p. d.	1 00	Aug. 15, 1881	Maryland	....do	
Mary Goodall	Apprentice's assistant	p. d.	1 25	Feb. 15, 1881	Maine	....do	
Elizabeth Harleston	.....do	p. d.	1 25	May 2, 1879	District of Columbia	....do	
Mary Harrington	.....do	p. d.	1 25	Dec. 6, 1880	....do	....do	
Maggie Hurley	.....do	p. d.	1 25	Sept. 16, 1879	....do	....do	
Maggie Kelly	.....do	p. d.	1 25	Oct. 9, 1878	... do	....do	
Ima Kingsley	.....do	p. d.	1 25	Dec. 3, 1878	...do	....do	
Mary R. McDonough	.....do	p. d.	1 25	Jan. 18, 1881	....do	....do	
Viola B. McMurry	.....do	p. d.	1 25	Jan. 26, 1874	Georgia	....do	
Mollie A. Miles	.....do	p. d.	1 25	Apr. 11, 1879	West Virginia	....do	
Mary Mitchell	.....do	p. d.	1 25	Dec. —, 1880	Illinois	....do	
Elizabeth Ray	.....do	p. d.	1 25	Dec. 2, 1878	New Jersey	....do	
Annie L. Reed	.....do	p. d.	1 25	Oct. 19, 1879	District of Columbia	....do	
Sarah Reese	.....do	p. d.	1 25	Nov. 26, 1878	....do	....do	

BUREAU OF ENGRAVING AND PRINTING—Continued.

Name.	Grade.	Compensation.	Date of appointment.	State to which charged.	White or colored.	War record.
Eliza K. Robertson	Apprentice's assistant	p. d. $1 25	July 28, 1879	Maryland	Colored	
Mary Tucker	do	p. d. 1 25	Dec. 11, 1880	District of Columbia	do	
Evelyn Brown	do	p. d. 1 25	July 28, 1881	Iowa	do	
Virginia Foss	Forewoman	p. d. 1 50	Jan. 10, 1876	Wisconsin	do	
Cecelia Arthur	Laundry-woman	Piece-rates.	Aug. 27, 1877	District of Columbia	do	
Emily Howard	do	do	Aug. 14, 1878	do	do	
Martha Jackson	do	do	Apr. 14, 1879	do	do	
Emily Miller	do	do	Feb. 20, 1879	do	do	
Isabella Barbour	do	do	May 1, 1873	do	do	
Diana Steptowe	do	do	Sept. 6, 1878	do	do	
Mary A. Griffin	do	do	Jan. 17, 1871	do	do	
Archibald R. Dick	Ink-maker	p. d. 4 00	June —, 1863	New York	White	Volunteer Navy five years.
Thomas Bradburn	do	p. d. 2 25	July —, 1863	District of Columbia	do	
William G. Wilding	Oil-burner	p. d. 5 00	Sept. 21, 1877	New York	do	
Anna L. Keys	Substitute	p. d. 1 00	Sept. 8, 1881	District of Columbia	do	
Lydia Boland	do	p. d. 1 00	July 26, 1881	Pennsylvania	do	
Maggie Flynn	do	p. d. 1 00	Oct. 11, 1881	District of Columbia	do	
Maggie Isel	do	p. d. 1 00	Oct. 12, 1881	do	do	
Jane Norwood	Counter	Piece-rates.	Mar. —, 1870	do	do	
Anna A. Ossire	do	do	May 10, 1875	do	do	
Lulie E. Paige	Counter	do	May 25, 1879	do	do	
Albertine G. Paris	do	do	July 1, 1880	do	do	
Helen C. Stuart	do	do	Sept. —, 1865	do	do	
Sarah E. Tanner	do	do	June 6, 1881	do	do	
Elizabeth Williams	do	do	May 10, 1875	do	do	
Printing Division.						
Ward Morgan	Superintendent	p. d. $8 50	Oct. 16, 1869	Pennsylvania	White	
John R. White	Superintendent of plate branch	p. d. 7 00	May 20, 1867	New York	do	
Albert Lauck	Assistant superintendent plate branch.	p. d. 5 00	June 10, 1878	do	do	
William A. Bealle	Examiner	p. d. 4 95	Apr. 19, 1876	District of Columbia	do	
Joseph L. Harley	Machinist	p. d. 4 00	Dec. 7, 1863	Maryland	do	
Abraham Alstead	Register-clerk	p. d. 4 00	Feb. 26, 1869	Pennsylvania	do	Volunteer Army two years and eight morths.
Samuel McPherson	do	p. d. 3 00	June —, 1869	Illinois	do	
George R. Koontz	do	p. d. 3 00	Aug. 1, 1879	District of Columbia	do	
Alexander Sealey	do	p. d. 3 00	Nov. 1, 1878	New York	do	
John B. Barnard	Helper	p. d. 3 00	Feb. 14, 1867	District of Columbia	do	
William J. Hay	do	p. d. 2 50	Jan. 1, 1869	do	do	
Charles C. Penn	Clerk	p. d. 2 50	Mar. 15, 1879	Pennsylvania	do	
Samuel D. Trimble	do	p. d. 2 50	July 10, 1878	District of Columbia	do	
John O'Riley	Helper	p. d. 2 00	May 1, 1871	do	do	
Annie M. Waller	Division clerk	p. d. 2 00	July —, 1868	do	do	

Annie Bolger	....do	p. d.	1 50	Nov. 15, 1875	....do	....do	
Mary Carroll	Messenger	p. d.	1 00	Nov. 4, 1872	....do	....do	
Ida Calhoun	....do	p. d.	1 00	Nov. 5, 1871	....do	....do	
Sarah J. Chipman	....do	p. d.	1 00	May 15, 1879	Michigan	....do	
Fannie C. Crowther	....do	p. d.	1 00	Apr. 15, 1879	District of Columbia	....do	
Margaret Donovan	....do	p. d.	1 00	Jan. 10, 1872	New York	....do	
Martha A. Gibson	....do	p. d.	1 00	Nov. —, 1869	District of Columbia	....do	
Emma La Porte	....do	p. d.	1 00	May 1, 1879	Kentucky	....do	
Margaret Robertson	....do	p. d.	1 25	Oct. 9, 1874	District of Columbia	....do	
Mary E. Robertson	....do	p. d.	1 00	Jan. 18, 1870	....do	....do	
Ann Walsh	....do	p. d.	1 00	Aug. 16, 1875	New York	....do	
Lucy A. Sweet	Substitute	p. d.	1 00	Oct. 17, 1881	District of Columbia	....do	
Annie Curry	....do	p. d.	1 00	Oct. 17, 1881	Maryland	....do	
Nellie Hannan	....do	p. d.	1 00	Oct. 17, 1881	District of Columbia	....do	
Mary E. Campan	....do	p. d.	1 00	Oct. 17, 1881	Maryland	....do	
Elizabeth Dwyer	....do	p. d.	1 00	Oct. 18, 1881	Massachusetts	....do	
Emma G. Hughes	....do	p. d.	1 00	Oct. 18, 1881	Virginia	....do	
Lizzie A. Kendall	....do	p. d.	1 00	Oct. 11, 1881	....do	.. do	
Blanche A. Kinsley	....do	p. d.	1 00	Oct. 18, 1881	District of Columbia	....do	
Plate-printers.							
Samuel E. Allen	Plate-printer	Piece-rates		July —, 1864	Pennsylvania	White	Volunteer Army.
Charles E. Banes	....do	....do		Apr. 24, 1876	....do	....do	
Joseph F. Barker	....do	....do		Sept. 12, 1881	New York	....do	
William R. Bellew	....do	.... do		Apr. 1, 1874	District of Columbia	....do	
Frank S. Bernard	....do	....do		June —, 1870	Pennsylvania	....do	Volunteer Army.
Eugene Bettes	....do	....do		Sept. —, 1864	Maine	....do	
Chris. G. Bollinger	....do	....do		Sept. 3, 1878	New York	.. do	
Bernard J. Boyle	....do	....do		Apr. 24, 1876	District of Columbia	.. do	
Oscar Bode	....do	....do		Sept. 25, 1881	New York	....do	
Alfred Bradford	....do	....do		Apr. 15, 1880	....do	....do	
Patrick H. Bradley	....do	....do		Mar. 25, 1880	....do	....do	
John E. Braitmayer	....do	....do		Sept. —, 1868	....do	....do	
Joseph D. Burns	....do	....do		Feb. 20, 1878	Maryland	....do	
George E. Burrows	....do	....do		Jan. 3, 1876	Indiana	....do	
William H. Burrows	....do	....do		—— —, 1874	....do	....do	Three months District of Columbia volunteers.
John H. Butt	....do	....do		Jan, 25, 1875	New York	....do	
Samuel Bell	....do	....do		Oct. 8, 1863	Pennsylvania	....do	
Henry Cansey	....do	....do		Jan. 19, 1874	....do	....do	
Sidney Castle	....do	.... do		Sept. 18, 1878	New York	....do	Volunteer Army.
William P. Challice	....do	....do		Sept. 16, 1881	....do	....do	
Frank Clark	....do	....do		Apr. —, 1874	....do	....do	Volunteer Army three years.
John T. Clarvoe	....do	....do		Nov. 9, 1872	District of Columbia	....do	
Francis D. Clement	....do	....do		May 8, 1879	New York	....do	
Turley Coburn	....do	....do		Mar. 5, 1873	Tennessee	....do	
Philip Coleback	....do	....do		June 20, 1879	New York	....do	
Robert Collie	....do	....do		Sept. 5, 1881	....do	....do	
Thomas W. Coleman	....do	....do		Apr. 24, 1876	Ohio	....do	
Cornelius Collins	....do	....do		Jan. —, 1864	Massachusetts	....do	
Patrick Collins	....do	....do		Oct. 22, 1872	New York	....do	Volunteer Army.
James Conlin	....do	....do		Sept. 11, 1878	....do	....do	

BUREAU OF ENGRAVING AND PRINTING—Continued.

Name.	Grade.	Compensation.	Date of appointment.	State to which charged.	White or colored.	War record.
John F. Conway	Plate-printer	Piece-rates	Oct. 9, 1878	District of Columbia	White	
James Corr	do	do	Sept. 2, 1878	New York	do	
James P. Cox	do	do	Apr. —, 1874	District of Columbia	do	Volunteer Army.
Horace Crawley	do	do	Sept. 26, 1881	Pennsylvania	do	
Michael Cuff	do	do	Jan. —, 1871	New York	do	
Robert Dalton	do	do	Feb. —, 1867	District of Columbia	do	
Theodore Dalton	do	do	Apr. 24, 1876	New York	do	
William H. Dalton	do	do	June 4, 1878	do	do	
James W. Davis	do	do	June 4, 1867	Pennsylvania	do	
James E. Denny	do	do	Sept. 6, 1878	New York	do	Volunteer Navy.
George W. Durfee	do	do	July 11, 1878	do	do	
Joseph M. Durfee	do	do	Apr. 19, 1876	do	do	
Tyler V. Durham	do	do	May 21, 1878	District of Columbia	do	
Edward Duschere	do	do	Nov. 12, 1880	New York	do	
George H. Dyer	do	do	Oct. 8, 1865	Massachusetts	do	
William H. Edwards	do	do	Sept. 1, 1868	New York	do	
James R. English	do	do	—— —, 1863	do	do	
William J. Fagan	do	do	Dec. 2, 1872	do	do	
John J. Finnigan	do	do	Apr. 24, 1876	Massachusetts	do	
Thomas Fitzsimmons	do	do	—— —, 1864	New York	do	
Oscar I. Ford	do	do	Mar. 13, 1875	Indiana	do	
Charles Fox	do	do	June 4, 1878	New York	do	
Joseph Gascoigne	do	do	Sept. 2, 1881	do	do	
Thomas H. Gedney	do	do	Sept. 17, 1881	District of Columbia	do	
Archibald H. Gibson	do	do	Sept. 12, 1881	Maryland	do	
William F. Gillen	do	do	Sept. 19, 1869	New York	do	
Daniel Gilmartin	do	do	June 12, 1878	do	do	
James Gowans	do	do	Feb. —, 1864	do	do	Volunteer Army.
Peter F. Gowans	do	do	Sept. —, 1864	do	do	Do.
John W. Gray	do	do	July 22, 1878	Pennsylvania	do	
Francis J. Grimes	do	do	July 16, 1878	New York	do	
George Haas	do	do	—— —, 1863	do	do	
John Hahn	do	do	Oct. —, 1866	Pennsylvania	do	Volunteer Army.
Henry Halpin	do	do	June 25, 1875	New Jersey	do	Do.
Alfred Hamilton	do	do	—— —, 1870	New York	do	Do.
John H. Hawkins	do	do	Dec. 26, 1878	New Jersey	do	
James P. Hayes	do	do	Mar. —, 1864	Pennsxlvania	do	Volunteer Army.
John Heim	do	do	Apr. 19, 1876	do	do	
Charles Huck	do	do	Apr. 24, 1876	New York	do	
Emile Huck	do	do	—— —, 1867	do	do	
Louis Huck	do	do	Sept. 5, 1881	do	do	
William H. Hudson	do	do	July 10, 1864	do	do	Volunteer Army.
James A. Hunter	do	do	Sept. 5, 1878	Pennsylvania	do	
Harvey W. P. Hunt	do	do	July 12, 1878	District of Columbia	do	

Walter H. Illman	do	do	Sept. 3, 1878	Pennsylvania	do	
Frank H. Isham	do	do	June 14, 1878	District of Columbia	do	
John Jones	do	do	Sept. 16, 1881	New York	do	
Edward L. Jordan	do	do	Oct. 23, 1877	Pennsylvania	do	
Michael H. Kearney	do	do	July 8, 1875	New York	do	
William L. Kearney	do	do	Apr. 2, 1874	District of Columbia	do	
James Kelly	do	do	Sept. 15, 1881	New York	do	
Samuel A. Kennedy	do	do	Sept. 16, 1881	District of Columbia	do	
Charles F. Kessler	do	do	Feb. —, 1865	Pennsylvania	do	
William H. Kessler	do	do	Oct. —, 1863	do	do	
John B. Knowles	do	do	July 16, 1874	do	do	
Kintzing P. Krouse	do	do	Dec. 6, 1875	District of Columbia	do	
Lewis H. Lauman	do	do	Sept. 20, 1866	New York	do	
Abraham D. Levi	do	do	Sept. 7, 1878	Pennsylvania	do	
William E. Little	do	do	July 17, 1878	New York	do	
William Locraft	do	do	Apr. 24, 1876	do	do	
Daniel J. Logan	do	do	Oct. 1, 1863	Pennsylvania	do	
Alexander Long	do	do	Feb. 24, 1875	do	do	
Charles H. Long	do	do	July 1, 1878	do	do	
Reese H. Long	do	do	Sept. 1, 1875	do	do	
George W. Levi	do	do	June 24, 1879	Illinois	do	
Robert E. Major	do	do	Sept. 14, 1878	Pennsylvania	do	
Thomas F. Mara	do	do	Sept. 5, 1881	New York	do	
Calhoun Marr	do	do	June 14, 1878	District of Columbia	do	
William Martie	do	do	Mar. 29, 1878	do	do	
John McClaren	do	do	Sept. 4, 1878	Pennsylvania	do	
George McCulloch	do	do	May 11, 1873	do	do	
John McGin, jr	do	do	Dec. 26, 1878	do	do	Volunteer Army three months.
Peter McGin	do	do	Dec. —, 1863	do	do	Volunteer Army.
J. Leo McGrew	do	do	July —, 1867	Virginia	do	
James McGuire	do	do	July 19, 1878	New York	do	
William C. McKinney	do	do	Mar. 30, 1874	Pennsylvania	do	
Frank McLaughlin	do	do	July 1, 1878	New York	do	
William J. McMahon	do	do	Apr. 24, 1876	do	do	
Edward E. Moore	do	do	June 7, 1878	Mississippi	do	
Michael Moylen	do	do	Apr. 24, 1876	New York	do	Volunteer Army.
Joseph Molloy	do	do	Jan. 3, 1876	do	do	
Henry H. Mullineaux	do	do	Apr. 24, 1876	Pennsylvania	do	Volunteer Army.
John B. Murray	do	do	Feb. 6, 1878	do	do	
Jeremiah Nagle	do	do	Aug. 1, 1879	do	do	
Michael Nolan	do	do	Sept. 15, 1881	New York	do	
Wilfred E. Nott	do	do	June 28, 1879	Connecticut	do	
Michael F. O'Grady	do	do	Nov. —, 1864	New York	do	
John O'Hara	do	do	June —, 1876	do	do	
Archibald J. O'Pray	do	do	Mar. 23, 1872	do	do	
Joseph B. Osborn	do	do	Nov. 16, 1874	Pennsylvania	do	Volunteer Army.
H. L. Osterman	do	do	Oct. 31, 1879	Ohio	do	
John F. Osterman	do	do	Jan. 2, 1880	do	do	
George F. Omerly	do	do	Sept. 2, 1869	Pennsylvania	do	
William Pallas	do	do	Sept. 2, 1881	New York	do	
Fred. J. Parks	do	do	Sept. 26, 1878	District of Columbia	do	
Cornelius J. Patton	do	do	Mar. 8, 1875	Pennsylvania	do	

BUREAU OF ENGRAVING AND PRINTING—Continued.

Name.	Grade.	Compensation.	Date of appointment.	State to which charged.	White or colored.	War record.
William H. Peck	Plate-printer	Piece-rates	Apr. —, 1864	Connecticut	White	Volunteer Army.
William J. Peck	do	do	July 1, 1874	Pennsylvania	do	
Samuel B. Pole	do	do	Dec. 26, 1878	do	do	
Robert Quig	do	do	Feb. —, 1873	do	do	
Charles H. Randall	do	do	July 10, 1874	Minnesota	do	
Patrick Ratigan	do	do	Feb. 19, 1878	New York	do	
William Redding	do	do	July 17, 1878	do	do	
John P. Reilly	do	do	Aug. 1, 1863	District of Columbia	do	
William H. Reiley	do	do	Oct. —, 1869	Pennsylvania	do	
John J. Reynolds	do	do	Oct. 8, 1878	Massachusetts	do	
George H. Rice	do	do	Apr. 19, 1876	New York	do	
Nicholas Riley	do	do	Mar. 20, 1875	do	do	
Charles E. Roberts	do	do	Sept. 28, 1878	do	do	
Andrew J. Robinson	do	do	May 26, 1879	District of Columbia	do	
Maurice Roche	do	do	May 21, 1867	New York	do	
Patrick Roche	do	do	—— —, 1864	do	do	Volunteer Army.
Richard Rogers	do	do	Oct. 16, 1878	New Jersey	do	
Thomas S. Rogers	do	do	Aug. 28, 1877	do	do	
Christopher Rourk	do	do	Jan. 7, 1878	do	do	
Henry Rubenacker	do	do	Aug. —, 1863	New York	do	
Dane D. Russell	do	do	Feb. 18, 1875	do	do	
Edward D. Ryan	do	do	Sept. 3, 1878	do	do	
William J. Ryan	do	do	May 5, 1874	District of Columbia	do	
George H. Saltmer	do	do	Sept. 22, 1869	Pennsylvania	do	
Albert Saphar	do	do	Sept. 26, 1881	New Jersey	do	
Anthony Schneider	do	do	Sept. 3, 1878	New York	do	Volunteer Army.
John A. Schneider	do	do	Dec. 2, 1878	do	do	
William J. Schneider	do	do	Mar. 30, 1875	do	do	Volunteer Army.
Franklin Schayer	do	do	June 11, 1878	do	do	
George W. Schayer	do	do	July 16, 1878	do	do	
Louis Schoyer	do	do	Dec. —, 1863	do	do	
John Scott	do	do	Nov. —, 1869	Ohio	do	
William H. Skerrett	do	do	Aug. —, 1863	Pennsylvania	do	
William Slocum	do	do	Dec. —, 1863	New York	do	
George W. Siggers	do	do	Sept. 15, 1881	Virginia	do	
Arthur Small	do	do	June —, 1864	New York	do	Volunteer Army.
Charles B. Smith	do	do	Dec. 1, 1863	do	do	
Curtis P. Smith	do	do	Aug. —, 1864	do	do	
Cornelius W. Smith	do	do	June 8, 1878	do	do	
Israel S. Smith	do	do	Nov. 2, 1874	District of Columbia	do	
Thomas Smith	do	do	Aug. —, 1864	New York	do	
Richard Somers	do	do	Sept. 24, 1875	Connecticut	do	
Robert H. Stacy	do	do	Sept. 8, 1881	New York	do	
Charles F. Stringer	do	do	July 20, 1878	New Jersey	do	

Thomas H. Sullivan	do	do	Sept. 9, 1881	Massachusetts	do		
George W. Schondelmeier	do	do	Apr. 24, 1876	New York	do		
Henry Szegedy	do	do	Apr. 23, 1873	Missouri	do		
Daniel Scarlet	do	do	Oct. 1, 1881	Pennsylvania	do		
Julian Tapp	do	do	Nov. 15, 1875	do	do		
John W. Thompson	do	do	Apr. 18, 1876	District of Columbia	do		
Benjamin F. Throop	do	do	Feb. 6, 1863	do	do		Volunteer Army.
Simon G. Throop	do	do	June 14, 1878	Mississippi	do		
Robert Toomb	do	do	Oct. 13, 1863	Pennsylvania	do		
William Torrens	do	do	Feb. 18, 1878	do	do		
John B. Ulrich	do	do	Feb. —, 1865	do	do		Volunteer Army.
William G. Van Horn	do	do	Sept. 3, 1878	do	do		
Jacob Von Derlehr	do	do	July 1, 1878	District of Columbia	do		
John Vosser	do	do	Sept. 5, 1881	New York	do		
William H. Waddington	do	do	Sept. —, 1868	Pennsylvania	do		
Emanuel Warth	do	do	Oct. 2, 1878	New York	do		
Charles J. Wells	do	do	June 7, 1878	do	do		
Joseph M. Wells	do	do	Oct. —, 1863	Pennsylvania	do		
Evan Welsh	do	do	Sept. 5, 1881	do	do		
John Wood	do	do	—— —, 1865	New York	do		
Robert Wood	do	do	Oct. —, 1863	do	do		
John G. Woodworth	do	do	Sept. 15, 1881	New Jersey	do		
Henry F. Arnold	Apprentice	do	May 1, 1879	District of Columbia	do		
George H. Barr	do	do	Feb. 8, 1879	do	do		
John A. Benedick	do	do	Feb. 1, 1876	Pennsylvania	do		
George W. Brown	do	do	July 1, 1875	District of Columbia	do		
Frank M. Dyer	do	do	Nov. 30, 1878	do	do		
Edwin C. Fowler	do	do	Apr. 28, 1879	do	do		
Louis H. Graves	do	do	Sept. 5, 1879	do	do		
Andrew Johnston	do	do	May 1, 1879	do	do		
Charles S. Lashhorn	do	do	Nov. 1, 1875	do	do		
Fortus B. McLain	do	do	Mar. 7, 1879	Nebraska	do		
William W. Parker	do	do	Nov. 26, 1878	District of Columbia	do		
George E. Ray	do	p. d. $1 00	July 14, 1879	Indiana	do		
Raymond S. Roth	do	Piece-rates	June 17, 1878	District of Columbia	do		
George F. Russell	do	do	July 12, 1878	do	do		
Nelson A. Ryon	do	do	July 14, 1875	Maryland	do		
Harvey H. Walsh	do	do	July 19, 1875	District of Columbia	do		
Alfred W. Cheseldine	do	p. d. 1 00	June 16, 1879	do	do		
Printers' Assistants.							
Letitia Ahern	Assistant	p. d. 1 25	Jan. 19, 1874	District of Columbia	White		
Margaret Ahern	do	p. d. 1 25	Nov. 22, 1872	do	do		
Maggie Ambrose	do	p. d. 1 25	Aug. 8, 1881	do	do		
Maria Anthony	do	p. d. 1 25	Feb. 16, 1875	do	do		
Martha Appleby	do	p. d. 1 25	Oct. —, 1869	do	do		
Gertrude Armstrong	do	p. d. 1 25	Apr. 1, 1880	do	do		
Ida E. Ash	do	p. d. 1 25	Nov. 19, 1880	do	do		
Margaret Ash	do	p. d. 1 25	Nov. —, 1863	do	do		
Lottie Bailey	do	p. d. 1 25	July —, 1863	Connecticut	do		
Bridget Baldwin	do	p. d. 1 25	Sept. 18, 1874	New York	do		

BUREAU OF ENGRAVING AND PRINTING—Continued.

Name.	Grade.	Compensation.	Date of appointment.	State to which charged.	White or colored.	War record.
Annie C. Barr	Assistant	p. d. $1 25	May 8, 1879	North Carolina	White	
Kate C. Barrett	do	p. d. 1 25	July 3, 1878	District of Columbia	do	
Sarah Blair	do	p. d. 1 25	Jan. 15, 1876	do	do	
Ida Bobee	do	p. d. 1 25	Apr. 7, 1879	Virginia	do	
Mary Brennan	do	p. d. 1 25	Oct. —, 1872	District of Columbia	do	
Theresa Broderick	do	p. d. 1 25	Feb. 3, 1874	Tennessee	do	
Mary A. Browne	do	p. d. 1 25	July 27, 1881	Pennsylvania	do	
Nellie Brown	do	p. d. 1 25	Oct. 24, 1880	District of Columbia	do	
Susie F. Brown	do	p. d. 1 25	Oct. 2, 1878	Virginia	do	
Mary Burke	do	p. d. 1 25	Sept. 25, 1874	District of Columbia	do	
Rebecca Burr	do	p. d. 1 25	May 1, 1879	do	do	
Maggie Byrne	do	p. d. 1 25	July 14, 1873	do	do	
Ella Bouret	do	p. d. 1 25	Aug. 19, 1881	do	do	
Kate Callan	do	p. d. 1 25	Jan. 25, 1870	Connecticut	do	
Mary Casey	do	p. d. 1 25	May 4, 1874	District of Columbia	do	
Alice J. Chapman	do	p. d. 1 25	Mar. 7, 1879	Iowa	do	
Kate Collins	do	p. d. 1 25	Mar. 15, 1875	District of Columbia	do	
Nellie Collins	do	p. d. 1 25	June —, 1878	Pennsylvania	do	
Ellen B. Coffey	do	p. d. 1 25	Jan. —, 1870	District of Columbia	do	
Kate M. Corcoran	do	p. d. 1 25	July 24, 1878	do	do	
Mary E. Corcoran	do	p. d. 1 25	Aug. 16, 1875	Minnesota	do	
Maggie M. Corcoran	do	p. d. 1 25	July 21, 1876	District of Columbia	do	
Annie Coburn	do	p. d. 1 25	July 18, 1881	New York	do	
Bettie Coyle	Printer's assistant	p. d. 1 25	July 18, 1881	District of Columbia	do	
Julia Cramer	do	p. d. 1 25	Nov. 10, 1873	Pennsylvania	do	
Jennie C. Craven	do	p. d. 1 25	Mar. 5, 1879	Indiana	do	
Carrie Creighton	do	p. d. 1 25	Nov. 16, 1874	District of Columbia	do	
Maggie Cross	do	p. d. 1 25	Feb. 1, 1873	Alabama	do	
Alice A. Cruit	do	p. d. 1 25	Aug. 29, 1878	District of Columbia	do	
Julia Curran	do	p. d. 1 25	May 22, 1870	do	do	
Alice Cage	do	p. d. 1 25	Aug. 22, 1881	do	do	
Annie Cogan	do	p. d. 1 25	Oct. 10, 1881	Maryland	do	
Johanna Collins	do	p. d. 1 25	Apr. —, 1863	District of Columbia	do	
Mary E. Davis	do	p. d. 1 25	Jan. 5, 1875	Ohio	do	
Annie E. Dean	do	p. d. 1 25	Oct. 11, 1875	District of Columbia	do	
Ellen C. Devine	do	p. d. 1 25	Feb. 2, 1871	Maryland	do	
Fredericka Dettmering	do	p. d. 1 25	Sept. 14, 1876	North Carolina	do	
Martha C. Devlin	do	p. d. 1 25	Feb. 1, 1879	District of Columbia	do	
Florence Doniphan	do	p. d. 1 25	Sept. 15, 1874	do	do	
Mary C. Donaher	do	p. d. 1 25	Aug. 17, 1875	do	do	
Mary A. Dore	do	p. d. 1 25	May 1, 1875	do	do	
Annie R. Dorian	do	p. d. 1 25	Oct. 6, 1879	do	do	
Annie J. Duffy	do	p. d. 1 25	Sept. 9, 1875	Connecticut	do	
Nellie Dunne	do	p. d. 1 25	Aug. 6, 1881	New York	do	

Margaret C. Dwyer	....do		p. d.	1 25	Mar. 10, 1875	District of Columbia	....do	
Mary E. Edmondston	....do		p. d.	1 25	May 8, 1879	....do	....do	
Jane E. Ellis	....do		p. d.	1 25	Feb. 16, 1874	....do	....do	
Mary A. Evleth	....do		p. d.	1 25	Sept. 22, 1880	... do	.. do	
Kate Ewald	....do		p. d.	1 25	Dec. 6, 1880	Illinois	....do	
Sallie Fagan	....do		p. d.	1 25	Dec. —, 1866	District of Columbia	...do	
Bridget Falvey	....do		p. d.	1 25	May 4, 1874	....do	....do	
Margaret E. Faunce	....do		p. d.	1 25	Apr. 8, 1879	....do	....do	
Mary Fealy	....do		p. d.	1 25	Mar. 6, 1875	....do	....do	
Jennie Fearson	....do		p. d.	1 25	Nov. 20, 1880	....do	....do	
Mary E. Fletcher	....do		p. d.	1 25	Aug. 2, 1880	....do	....do	
Mary E. Flynn	....do		p. d.	1 25	Aug. 16, 1881	Virginia	....do	
Anna Forsberg	....do		p. d.	1 25	July 15, 1881	District of Columbia	....do	
Jennie W. Franklin	....do		p. d.	1 25	Apr. 29, 1879	Georgia	....do	
Julia I. Fry	....do		p. d.	1 25	Nov. 6, 1878	District of Columbia	....do	
Mary E. Ganety	....do		p. d.	1 25	Nov. 20, 1878	....do	....do	
Annie Geddes	....do		p. d.	1 25	Aug. 23, 1870	....do	....do	
Lizzie Gleason	....do		p. d.	1 25	Aug. 6, 1881	....do	....do	
Mary Gleason	....do		p. d.	1 25	Mar. 10, 1873	Indiana	....do	
Mary E. Gleason	....do		p d.	1 25	Sept. 3, 1878	District of Columbia	... do	
Mary Gormley	... do		p. d.	1 25	Mar. —, 1870	Colorado	....do	
Eliza Graham	....do		p. d.	1 25	Sept. 19, 1870	District of Columbia	....do	
Mary E. Graham	....do		p. d.	1 25	Mar. 22, 1874	....do	....do	
Mary Griffin	... do		p. d.	1 25	May 1, 1874	....do	....do	
Laura M. Groves	....do		p. d.	1 25	Nov. 22, 1880	Michigan	....do	
Bridget Galivan	....do		p. d.	1 25	Oct. 10, 1881	Massachusetts	....do	
Mary A. Hagan	....do		p. d.	1 25	Oct. 1, 1879	Kansas	....do	
Nellie Hall	....do		p. d.	1 25	Sept. 2, 1874	Virginia	....do	
Fannie V. Harrison	... do		p. d.	1 25	Nov. 14, 1878	District of Columbia	....do	
Mary F. Harvey	....do		p. d.	1 25	Aug. 16, 1875	....do	....do	
Louisa Hauptman	....do		p. d.	1 25	Nov. —, 1880	....do	....do	
Louise B. Hazel	... do		p. d.	1 25	Nov. 29, 1880	....do	....do	
Laurette Hendricks	....do		p. d.	1 25	Aug. 15, 1877	... do	... do	
Louisa Hermann	....do		p. d.	1 25	Jan. 20, 1874	....do	... do	
Sarah Hess	....do		p. d.	1 25	Jan. 21, 1876	....do	....do	
Helen M. Hill	....do		p. d.	1 25	June 15, 1877	.. do	....do	
Ida B. Higleigh	....do		p. d.	1 25	Aug. 6, 1881	New York	.. do	
Virginia Horsey	....do		p. d.	1 25	Jan. 3, 1881	Delaware	....do	
Teresa Hunt	....do		p. d.	1 25	June 3, 1877	District of Columbia	....do	
Lizzie Ingle	....do		p. d.	1 25	Mar. 6, 1874	Minnesota	....do	
Mary Irving	....do		p. d.	1 25	June 21, 1876	District of Columbia	....do	
Mary L. James	....do		p. d.	1 25	Nov. 24, 1879	....do	....do	
Maggie Johnston	....do		p. d.	1 25	Sept. 16, 1874	Maryland	... do	
Mattie F. Jones	....do		p. d.	1 25	Mar. 2, 1878	Tennessee	....do	
Mary Joy	....do		p. d.	1 25	Sept. 14, 1874	District of Columbia	....do	
Ellen E. Kane	....do		p. d.	1 25	Jan. 19, 1876	....do	....do	
Mary Kane	....do		p. d.	1 25	Mar. 9, 1874	....do	....do	
Mary E. Kane	....do		p. d.	1 25	Apr. 15, 1879	Pennsylvania	....do	
Eliza Keefe	... do		p. d.	1 25	July 21, 1870	District of Columbia	....do	
Johanna Kelly	....do		p. d.	1 25	Aug. 13, 1872	....do	....do	
Emma Kershaw	....do		p. d.	1 25	July 7, 1881	....do	....do	
Delia Keys	....do		p. d.	1 25	July 15, 1878	....do	....do	

BUREAU OF ENGRAVING AND PRINTING—Continued.

Name.	Grade.	Compensation.	Date of appointment.	State to which charged.	White or colored.	War record.
Mary Kline	Printer's assistant	p. d. $1 25	Aug. 15, 1878	District of Columbia	White	
Alice A. Knowles	do	p. d. 1 25	Aug. 18, 1881	do	do	
Delia Knox	do	p. d. 1 25	Jan. 3, 1876	do	do	
Belle Koehler	do	p. d. 1 25	July 18, 1878	do	do	
Florence A. Krepps	do	p. d. 1 25	July 7, 1881	West Virginia	do	
Ida Keirle	do	p. d. 1 25	July 26, 1881	District of Columbia	do	
Bertie A. Kingsbury	do	p. d. 1 25	Mar. 8, 1879	do	do	
Salina Lawton	do	p. d. 1 25	June —, 1868	Massachusetts	do	
Elbertine G. Lansdale	do	p. d. 1 25	Aug. 4, 1880	Wyoming	do	
Jane B. Lawrie	do	p. d. 1 25	Apr. 9, 1879	Illinois	do	
Mary Leary	do	p. d. 1 25	May —, 1865	District of Columbia	do	
Alice Lehman	do	p. d. 1 25	Nov. 15, 1877	New Jersey	do	
Johanna Lenihan	do	p. d. 1 25	Sept. 1, 1875	District of Columbia	do	
Maggie A. Lister	do	p. d. 1 25	Oct. 22, 1879	Pennsylvania	do	
Mary Long	do	p. d. 1 25	Jan. 4, 1872	District of Columbia	do	
Kate Lowndes	do	p. d. 1 25	Aug. 19, 1880	Maryland	do	
Mary Lyons	do	p. d. 1 25	Oct. —, 1868	District of Columbia	do	
Ellen Lynch	do	p. d. 1 25	Feb. 10, 1874	do	do	
Felicita G. Lynch	do	p. d. 1 25	July 7, 1881	do	do	
Maria L. Litchfield	do	p. d. 1 25	Aug. 24, 1881	New York	do	
Norah Leary	do	p. d. 1 25	Oct. 11, 1881	District of Columbia	do	
Martha Mace	do	p. d. 1 25	July 1, 1878	do	do	
Mary Madigan	do	p. d. 1 25	Oct. 9, 1874	do	do	
Kate Maguire	do	p. d. 1 25	July —, 1868	Iowa	do	
Maggie Maloney	do	p. d. 1 25	Feb. 2, 1874	District of Columbia	do	
Josephine Mansfield	do	p. d. 1 25	Jan. 13, 1880	do	do	
Emma A. Markley	do	p. d. 1 25	Nov. —, 1880	Ohio	do	
Mary G. Marcellus	do	p. d. 1 25	Jan. 24, 1878	Tennessee	do	
Teresa Marshall	do	p. d. 1 25	Mar. 10, 1873	District of Columbia	do	
Linnie B. Martin	do	p. d. 1 25	Apr. 21, 1879	Maryland	do	
Lizzie Martin	do	p. d. 1 25	Dec. 8, 1880	District of Columbia	do	
Louisa R. McCarthy	do	p. d. 1 25	June 23, 1879	do	do	
Sophia McCarthy	do	p. d. 1 25	Apr. 21, 1874	do	do	
Lettie McFee	do	p. d. 1 25	Sept. 22, 1879	do	do	
May McGuire	do	p. d. 1 25	Aug. 20, 1881	New York	do	
Bridget McNamara	do	p. d. 1 25	Mar. 13, 1873	District of Columbia	do	
Margaret T. McNamara	do	p. d. 1 25	Mar. 14, 1878	do	do	
Mary Meehan	do	p. d. 1 25	Feb. 9, 1874	do	do	
Minnie Miller	do	p. d. 1 25	Sept. 13, 1878	do	do	
Agnes Mitchell	do	p. d. 1 25	Apr. 29, 1879	do	do	
Maggie M. Morgan	do	p. d. 1 25	Dec. 3, 1878	do	do	
Mary R. Mulvahill	do	p. d. 1 25	Dec. 8, 1872	do	do	
Kate Murdock	do	p. d. 1 25	Jan. 3, 1876	do	do	
Bessie Murphy	do	p. d. 1 25	Mar. 16, 1874	do	do	

Kate S. Murphy	do		p. d.	1	25	Jan. 3, 1881	do	do	
Mary Murphy	do		p. d.	1	25	Apr. 23, 1875	do	do	
Annie Myers	do		p. d.	1	25	Apr. —, 1864	do	do	
Isabel W. Mortimer	do		p. d.	1	25	Sept. 5, 1881	Maryland	do	
Julia Nachman	do		p. d.	1	25	July 6, 1881	do	do	
Annie Neville	do		p. d.	1	25	July 21, 1876	New York	do	
Kate Norbeck	do		p. d.	1	25	Aug. 24, 1875	District of Columbia	do	
Annie M. O'Bryon	do		p. d.	1	25	Mar. 9, 1878	do	do	
Sarah Odenwald	do		p. d.	1	25	Nov. 3, 1879	do	do	
Mary J. O'Leary	do		p. d.	1	25	May 27, 1870	do	do	
Annie E. O'Neill	do		p. d.	1	25	June 8, 1878	do	do	
Bridget C. O'Neill	do		p. d.	1	25	May 17, 1875	Ohio	do	
Mary A. O'Neill	do		p. d.	1	25	May 26, 1871	District of Columbia	do	
Mary O'Toole	do		p. d.	1	25	July 6, 1874	do	do	
Mary Parkinson	do		p. d.	1	25	Aug. 5, 1881		do	
Sarah Popkins	do		p. d.	1	25	Dec. 26, 1878	District of Columbia	do	
Mary E. Quirk	do		p. d.	1	25	Apr. 19, 1876	Mississippi	do	
Nellie Ready	do		p. d.	1	25	Mar. 1, 1875	Texas	do	
Martha Recard	do		p. d.	1	25	Feb. 15, 1872	District of Columbia	do	
Annie Redmond	do		p. d.	1	25	July 19, 1878	do	do	
Annie E. Reed	do		p. d.	1	25	Nov. 20, 1878	do	do	
Ruth A. E. Reed	do		p. d.	1	25	Dec. 8, 1879	do	do	
Kate Reidy	do		p. d.	1	25	May 12, 1870	do	do	
Kate E. Reidy	do		p. d.	1	25	Sept. 2, 1878	do	do	
Mary A. Regan	do		p. d.	1	25	Aug. 10, 1878	do	do	
Emma T. Reiss	do		p. d.	1	25	Dec. 3, 1880	do	do	
Mary Robert	do		p. d.	1	25	Feb. 1, 1878	do	do	
Julia A. Robertson	do		p. d.	1	25	Aug. 2, 1880	do	do	
Laura F. Rolles	do		p. d.	1	25	Jan. 8, 1879	Maryland	do	
Pauline Rubenstine	do		p. d.	1	25	June 1, 1875	Florida	do	
Josephine Ryan	do		p. d.	1	25	Apr. 23, 1879	Iowa	do	
Jessie F. Sauerwein	do		p. d.	1	25	Oct. 4, 1879	District of Columbia	do	
Ida M. Selby	do		p. d.	1	25	July 28, 1880	do	do	
Kate Shehan	do		p. d.	1	25	July 26, 1881	do	do	
Mary Shehan	do		p. d.	1	25	July 1, 1875	Indiana	do	
Annie E. Sherwood	do		p. d.	1	25	Mar. 9, 1880	District of Columbia	do	
Helen S. Spalding	do		p. d.	1	25	Dec. 2, 1872	do	do	
Elizabeth M. Stepper	do		p. d.	1	25	Nov. —, 1879	do	do	
Harriet E. Storm	do		p. d.	1	25	Apr. —, 1869	Ohio	do	
Mary Stundon	do		p. d.	1	25	June 12, 1878	Virginia	do	
Amanda Sullivan	do		p. d.	1	25	July 27, 1873	District of Columbia	do	
Annie B. Sullivan	do		p. d.	1	25	Dec. 2, 1878	do	do	
Margaret Sullivan	do		p. d.	1	25	May —, 1867	New York	do	
Catherine C. Swann	do		p. d.	1	25	July 17, 1878	District of Columbia	do	
Joanna Sweeney	do		p. d.	1	25	Jan. 10, 1876	Illinois	do	
Mary C. Langston	do		p. d.	1	25	Jan. 4, 1881	Virginia	do	
Alexenia Taylor	do		p. d.	1	25	Sept. 1, 1872	District of Columbia	do	
Mary M. Tobin	do		p. d.	1	25	Mar. 23, 1873	New York	do	
Johanna Twomey	do		p. d.	1	25	June 11, 1778	District of Columbia	do	
Annie Waller	do		p. d.	1	25	Sept. 16, 1874	do	do	
Laura V. Warner	do		p. d.	1	25	Apr. 5, 1871	do	do	
Annie E. Ware	do		p. d.	1	25	Oct. 23, 1879	Virginia	do	

BUREAU OF ENGRAVING AND PRINTING—Continued.

Name.	Grade.	Compensation.	Date of appointment.	State to which charged.	White or colored.	War record.
Lucy M. Watson	Printer's assistant	p. d. $1 25	Apr. 21, 1879	District of Columbia	White	
H. Virginia Weinberger	do	p. d. 1 25	Aug. 13, 1880	do	do	
Elizabeth V. Welch	do	p. d. 1 25	Jan. 21, 1881	Nebraska	do	
Ella J. Williams	do	p. d. 1 25	Aug. 8, 1881	Virginia	do	
Lucy White	do	p. d. 1 25	May 23, 1879	District of Columbia	do	
Catherine Wolfe	do	p. d. 1 25	Apr. 18, 1873	do	do	
Sarah D. Wright	do	p. d. 1 25	June —, 1867	do	do	
Ida M. Weeks	do	p. d. 1 25	Aug. 2, 1881	do	do	
Elizabeth Hart	do	p. d. 1 25	Sept. 14, 1881	New York	do	
Lizzie Reynolds	do	p. d. 1 25	Aug. 6, 1881	do	do	
Minnie Baur	do	p. d. 1 25	Sept. 8, 1879	do	do	
Surface Branch.						
Harriet C. Stickney	Clerk in charge	p. d. 4 00	Jan. 23, 1871	New Hampshire	White	
Thomas J. Parker	Foreman	p. d. 4 50	Nov. 2, 1870	New York	do	
Vona L. Moore	Expert	p. d. 2 50	Oct. 2, 1876	Ohio	do	
Charles E. Beach	Pressman	p. d. 4 00	July 20, 1880	District of Columbia	do	
Isaac L. Jackson	do	p. d. 4 00	July 10, 1877	Iowa	do	
Charles D. Parsons	do	p. d. 4 00	Sept. 1, 1881	District of Columbia	do	District Volunteers.
John H. Carnes	do	p. d. 3 20	May 22, 1876	Indiana	do	
Thomas Stone	Apprentice	p. d. 2 00	May 18, 1877	District of Columbia	do	
William C. Martin	do	p. d. 1 00	Mar. 22, 1880	do	do	
Edward Brown	Helper	p. d. 2 00	May 20, 1872	do	Colored	
James F. Hogan	do	p. d. 1 50	Nov. 4, 1878	do	White	
Daniel T. Jackson	do	p. d. 2 00	Sept. 29, 1869	do	Colored	Volunteer Army.
Robert H. Parker	do	p. d. 1 50	July 27, 1881	Maryland	White	
Thomas H. Smith	do	p. d. 2 00	Nov. 20, 1879	District of Columbia	do	
Mary J. Bessey	Counter	Piece-rates	Nov. 8, 1872	New Jersey	do	
Lydia C. Cole	do	do	Feb. —, 1874	Rhode Island	do	
Ella F. Larken	do	do	Dec. 4, 1879	District of Columbia	do	
Arabella Suit	do	do	July 11, 1873	Maryland	do	
Rosamond E. Campbell	Press-feeder	do	Aug. 5, 1875	Vermont	do	
Louise Capehart	do	do	June 27, 1881	California	do	
Jennie Edwards	do	do	Oct. —, 1864	District of Columbia	do	
Ida Fowler	do	do	Apr. 22, 1880	do	do	
Mary E. Herrity	do	do	Nov. 7, 1872	do	do	
Cordelia Mickle	do	do	Oct. 13, 1879	do	do	
Alice F. Mifflin	do	do	Sept. 1, 1873	Pennsylvania	do	
Emma W. Stokes	do	do	Nov. 2, 1878	District of Columbia	do	
Mattie H. Yeatman	do	do	Mar. 4, 1879	Virginia	do	
Examining Division.						
Annie E. Beadle	Superintendent	p. d. 5 00	May —, 1867	Maryland	White	

Belle R. Dickson	Clerk	p. d.	2 50	Nov. 23, 1872	Illinois	....do	
Mary A. Poole	Expert	p. d.	2 00	Nov. —, 1869	District of Columbia	....do	
Lavenia Barnhouse	Division clerk	p. d.	2 00	Dec. 11, 1869	.. do	....do	
Kate Byram	.....do	p. d.	2 00	Oct. 1, 1874	.. do	....do	
Annie M. Dailey	.....do	p. d.	2 00	Apr. 13, 1874	Ohio	....do	
Mary E. Ewer	.....do	p. d.	2 00	Nov. 8, 1880	District of Columbia	....do	
Jessie S. Foot	.....do	p. d.	2 00	Apr. 20, 1876	New York	....do	
A. Louise McCullough	.....do	p. d.	2 00	Nov. 10, 1880	Louisiana	.. do	
Naomi Ryan	.....do	p. d.	2 00	July —, 1864	Maryland	....do	
Jacob M. Black	Helper	p. d.	2 50	Aug. —, 1867	Virginia	.. do	
William M. Stellé	.....do	p. d.	2 25	Dec. —, 1871	District of Columbia	....do	Volunteer Army.
Nelson J. Booker	.....do	p. d.	2 00	Aug. 16, 1879	New Hampshire	Colored ..	Do.
Charles H. Crocker	.....do	p. d.	2 00	June 21, 1877	District of Columbia	....do	
John L. Gregory	.....do	p. d.	2 00	Sept. —, 1869	....do	.. do	
Charles A. Lochrey	.....do	p. d.	2 00	Oct. 8, 1875	....do	....do	
William H. Van Vleck	.... do	p. d.	2 00	June 8, 1878	New York	....do	
Leander K. Zook	.....do	p. d.	2 00	Aug. 5, 1878	Kansas	....do	Volunteer Army.
Primus Bagley	Laborer	p. d.	1 50	Apr. 27, 1880	Virginia	....do	
Hugh Donahue	.... do	p. d.	1 50	Oct. 7, 1880	District of Columbia	....do	
Edward A. Baulsir	Helper	p. d.	75	Mar. 25, 1879	.. do	....do	
Sayles B. Tarpin	....do	p. d.	1 00	July 8, 1881	....do	....do	
Lewis Thompson	Laborer	p. d.	1 00	July 25, 1881	Virginia	....do	
Mary C. Henry	Tissue-hand	p. d.	1 00	Apr. 1, 1880	Pennsylvania	White ...	
Rebecca Quinter	.....do	p. d.	1 00	Apr. 25, 1879	....do	....do	
Mary A. Egan	Shaker	p. d.	1 50	Aug. 7, 1879	District of Columbia	....do	
Elizabeth H. Boss	.....do	p. d.	1 50	May 16, 1879	Mississippi	....do	
Emily A. Gordon	.....do	p. d.	1 50	May 14, 1875	New Hampshire	....do	
Sarah S. Baden	Caller	p. d.	1 25	July 1, 1876	District of Columbia	....do	
Ida M. Hodgkins	.....do	p. d.	1 25	Feb. 4, 1879	Illinois	....do	
Alice M. Bigley	Assorter	Average	....	Mar. —, 1872	District of Columbia	....do	
Ellen Carey	.....do	....do	....	Mar. —, 1864	....do	....do	
Kate M. Cogan	.... do	....do	....	Apr. —, 1868	....do	....do	
Josephine S. French	.....do	....do	....	June 26, 1874	Pennsylvania	....do	
Annie Hussey	.....do	....do	....	June —, 1864	District of Columbia	....do	
Jennie C. Neale	Assorter	....do	....	Aug. 5, 1878	....do	....do	
Lucy Pettibone	.....do	....do	....	Mar. —, 1867	....do	....do	
Kate Ahern	Counter	p. d.	1 50	Apr. 21, 1870	....do	....do	
Ella S. Cotton	Division clerk	p. d.	1 50	Oct. 17, 1878	....do	....do	
M. Addie Martin	.....do	p. d.	1 50	July 6, 1880	....do	....do	
M. Jennie Williams	.....do	p. d.	1 50	Nov. 21, 1877	Maryland	... do	
Lottie C. Williams	Shaker	p. d.	1 00	July 18, 1881	Ohio	....do	
Mary J. Cunningham	Presser	Piece-rates	..	Oct. 1, 1872	....do	....do	
Elizabeth C. Barber	.....do	....do	....	July 27, 1877	Pennsylvania	....do	
Mary W. Bullard	.....do	....do	....	Apr. 7, 1879	West Virginia	....do	
Annie J. Carroll	.....do	....do	....	July 22, 1872	District of Columbia	... do	
Eliza A. Cooke	.....do	....do	....	Jan. 2, 1873	Pennsylvania	....do	
Mary A. Cronin	.....do	....do	....	July 1, 1878	District of Columbia	....do	
Annie Dailey	.....do	....do	....	May 4, 1867	... do	....do	
Margaret De Chanier	.....do	....do	....	Apr. 22, 1872	....do	....do	
Sophia R. Miller	.....do	....do	....	July 1, 1878	....do	....do	
Margaret A. Pendergast	.....do	....do	....	Mar. 17, 1879	Indiana	....do	
Fannie Perry	.....do	....do	....	Sept. —, 1869	District of Columbia	....do	

BUREAU OF ENGRAVING AND PRINTING—Continued.

Name.	Grade.	Compensation.	Date of appointment.	State to which charged.	White or colored.	War record.
Hattie Sisson	Presser	Piece-rates	July 19, 1875	District of Columbia	White	
Mary E. Waller	do	do	Aug. 22, 1879	North Carolina	do	
Kate Wilson	do	do	June 6, 1871	District of Columbia	do	
Jane W. Brooks	Wet-counter	do	Apr. 17, 1873	do	do	
Kate A. Dickens	do	do	Feb. 1, 1870	do	do	
Annie M. C. Quinn	do	do	Sept. —, 1874	New Hampshire	do	
Ellen M. Taylor	do	do	Oct. —, 1868	New York	do	
Kate Tierney	do	do	Apr. 13, 1875	do	do	
Mary E. Benley	Counter	do	July. —, 1863	District of Columbia	do	
Mary A. Hilton	Messenger	p. d. $1 00	Apr. 18, 1876	North Carolina	Colored	
Mary Hunter	do	p. d. 1 00	June 4, 1878	District of Columbia	do	
Isabella C. Barret	Examiner	Piece-rates	Mar. 10, 1873	do	White	
Emelia Cooke	do	do	May 11, 1870	do	do	
Emma L. Charlton	do	do	Oct. 6, 1873	do	do	
Laura J. Crampsey	do	do	Jan. 10, 1872	do	do	
Mary E. Fay	do	do	Mar. 24, 1879	Maryland	do	
Eliza J. Freeland	do	do	July 19, 1864	District of Columbia	do	
Matilda Hart	do	do	Mar. 9, 1874	Pennsylvania	do	
Bettie M. Hargrove	do	do	Nov. 17, 1873	District of Columbia	do	
Alice Heaton	do	do	Sept. 1, 1872	do	do	
Violetta S. Hopson	do	do	Dec. 2, 1878	Wisconsin	do	
Mary Myers	do	do	July 26, 1878	District of Columbia	do	Volunteer Army during war.
Kate Ross	do	do	— —, 1869	do	do	
Julietta T. Tucker	do	do	Nov. 1, 1871	do	do	
Janie Willis	do	do	Dec. 4, 1875	Virginia	do	
Jannette E. Wilson	do	do	July 11, 1873	Kentucky	do	
India Woltz	do	do	Oct. 9, 1873	Virginia	do	
Lizzie Lambeth	Clerk	p. d. 1 50	Nov. 19, 1873	Maryland	do	
Jennie Prosperi	Examiner	Piece-rates	July 22, 1881	South Carolina	do	
Binding Division.						
Thomas P. Sparks	Superintendent	p. d. $6 00	Mar. —, 1864	Ohio	White	
Rosalie Ferguson	Clerk	p. d. 3 25	Oct. 14, 1869	District of Columbia	do	
Cornelia Nichols	do	p. d. 2 00	Mar. 17, 1873	do	do	
Calista A. Baker	do	p. d. 2 00	Sept.—, 1879	Virginia	do	
Martha G. Hopkins	Clerk in charge of perforating	p. d. 3 50	Feb. 12, 1875	Kentucky	do	
Francene L. Brown	Clerk in charge of gumming	p. d. 2 50	Mar. 30, 1874	Massachusetts	do	
Oscar H. Sailor	Book-binder	p. d. 3 20	Sept. 4, 1880	Pennsylvania	do	Volunteer Army.
Charles W. Sparks	do	p. d. 3 20	Sept. 2, 1881	District of Columbia	do	
Robert H. Zimmerman	do	p. d. 3 20	Aug. 23, 1872	do	do	
Burrill Wood	Helper	p. d. 2 00	Jan. 12, 1877	do	Colored	
Daniel Brown	do	p. d. 1 50	July —, 1872	Virginia	do	Volunteer Army.
John N. Hunt	do	p. d. 1 50	Jan. 3, 1880	Indiana	do	

Duncan M. Perkins	....do	p. d. 1 50	Mar. 8, 1880	District of Columbia	White	
William E. Reed	....do	p. d. 1 50	Jan. 3, 1880	Virginia	Colored	
John Welch	....do	p. d. 1 50	Mar. 1, 1880	Massachusetts	White	Volunteer Army.
Edward W. Robertson	Boy	p. d. 50	Nov. 15, 1880	District of Columbia	.. do	
George P. Jackson, r	Apprentice	p. d. 1 60	June 11, 1878	Virginia	....do	
Bernard J. Smith	....do	p. d. 2 00	Nov. 20, 1877	District of Columbia	....do	
Elizabeth W. Ray	Messenger	p. d. 1 00	Jan. 2, 1880	Massachusetts	Colored	
Louisa Ware	Cleaner	p. d. 1 25	Dec. —, 1869	District of Columbia	....do	
Alena E. Graves	Miscellaneous	Average	Nov. 6, 1872	....do	White	
Sarah E. McCafferty	....do	....do	June 2, 1879	....do	....do	
Catherine A. McGill	....do	....do	Sept. —, 1864	Pennsylvania	... do	
Fannie J. Bennet	Perforator	Piece-rates	Aug. 1, 1879	New York	....do	
Mary Connolly	....do	....do	Aug. 19, 1872	District of Columbia	....do	
Julia Daley	....do	....do	Nov. —, 1867	Vermont	....do	
Ruth Davis	....do	....do	Sept. —, 1869	District of Columbia	....do	
Annie M. Fitzgerald	....do	....do	Jan. 1, 1871	Missouri	... do	
Amelia Helmuth	....do	....do	Nov. 1, 1877	District of Columbia	....do	
Haddie Petheridge	....do	....do	Aug. —, 1868	Maryland	....do	
Lizzie A. Tobe	....do	....do	Jan. 3, 1881	District of Columbia	....do	
Lotia L. Frank	Paster	....do	Feb. 19, 1877	Indiana	....do	
Rosalie W. Mackall	....do	....do	Aug. 6, 1877	North Carolina	...do	
Queenie Smith	....do	....do	Nov. 19, 1878	Mississippi	....do	
Joanna Sprignsan	....do	....do	Oct. 28, 1878	District of Columbia	....do	
Virginia B. Magruder	Stitcher and needler	....do	Dec. 17, 1872	....do	....do	
M. Martha Mundell	....do	....do	July 1, 1873	....do	....do	
Kate A. Reilly	....do	....do	Dec. 30, 1880	....do	....do	
Mary K. Ellis	Counter	....do	Sept. 1, 1880	New York	...do	
Mary A. Keegan	....do	....do	Sept. 21, 1880	Connecticut	....do	
Mary J. Man	....do	....do	Mar. 18, 1874	District of Columbia	....do	
Mary M. Mullen	....do	....do	Sept. 2, 1874	....do	....do	
Martha A. Volk	....do	....do	Dec. 10, 1877	....do	....do	
Nellia Atherton	Perforator	....do	Oct. 17, 1878	Pennsylvania	....do	
Mary L. Cain	Box-tender	... do	Nov. 26, 1879	District of Columbia	....do	
Fannie Cassidy	....do	....do	May 11, 1874	Maryland	....do	
Annie H. Elliott	....do	....do	Mar. 6, 1879	Diryland a	....do	
Elizabeth Fisher	....do	....do	Nov. 13, 1872	Virginia	....do	
Mary E. Fitch	....do	....do	July —, 1868	District of Columbia	....do	
Annie Griffin	....do	....do	May —, 1874	....do	....do	
Della V. Potter	....do	....do	Dec. —, 1874	Pennsylvania	....do	
Sarah Riley	....do	....do	Oct. 24, 1874	District of Columbia	....do	
Page Saunders	....do	....do	May 2, 1876	Virginia	....do	
Barbara Whittington	....do	....do	Feb. 9, 1874	Pennsylvania	....do	
Addie Biddleman	Straightener	....do	Jan. 9, 1873	District of Columbia	....do	
Ellen E. Donahue	....do	....do	Mar. 6, 1872	....do	....do	
Mary A. Hogan	....do	....do	July 1, 1878	....do	....do	
Maria Jones	....do	....do	Jan. 17, 1881	....do	....do	
Laura R. Leffingwell	....do	....do	Feb. 15, 1879	....do	... do	
Elida V. Lesson	....do	....do	Nov. 12, 1880	Pennsylvania	....do	
Sarah E. Thompson	....do	....do	Mar. 19, 1879	Tennessee	....do	
Blanche A. Bradley	Gummer	....do	Sept. —, 1868	Columbia	....do	
Susan M. Burroughs	....do	....do	Sept. 1, 1880	Maryland	....do	
Margaret Conner	....do	....do	Aug. 23, 1880	Ohio	....do	

BUREAU OF ENGRAVING AND PRINTING—Continued.

Name.	Grade.	Compensation.	Date of appointment.	State to which charged.	White or colored.	War record.
Mary J. Giddings	Gummer	Piece-rates	Nov. 20, 1878	District of Columbia	White	
Elizabeth Hickey	do	do	Feb. —, 1872	do	do	
Marie L. Hunter	do	do	Nov. 3, 1880	Iowa	do	
Celestia A. Ferris	do	do	July 21, 1879	New York	do	
Mary A. King	do	do	July 12, 1875	do	do	
Mary F. Seaton	do	do	Aug. 23, 1880	Michigan	do	
Elvie Fletcher	Spreader	do	Dec. 1, 1880	District of Columbia	do	
Annie Hanford	do	do	Jan. 14, 1881	New York	do	
Ethel Larcombe	do	do	Dec. 3, 1880	District of Columbia	do	
Josephine A. Mallory	do	do	Dec. 6, 1880	Louisiana	do	
Minnie L. Morgan	do	do	Dec. 14, 1880	California	do	
Anna P. Oertly	do	do	July 8, 1881	Virginia	do	
Annie M. Secchi	do	p. d. $1 25	Sept. 3, 1878	Nevada	do	
Lillie V. Smith	do	p. d. 1 25	Dec. 3, 1880	Maryland	do	
Kate A. Dinneen	Taker out of boards	p. d. 1 25	Apr. 25, 1879	Minnesota	do	
Ella Falconer	do	p. d. 1 25	Nov. 23, 1880	District of Columbia	do	
Mary Mullan	do	p. d. 1 25	Sept. 15, 1880	Maryland	do	
Numbering Division.						
Annie R. Roe	Superintendent	p. d. $5 00	June —, 1865	District of Columbia	White	
James D. Smith	Electrician	p. d. 5 00	Oct. —, 1865	do	do	
James R. Brown	Machinist	p. d. 2 50	Apr. 20, 1879	do	do	
Joseph Kleindienst	do	p. d. 3 00	Apr. —, 1864	do	do	
William H. Coeyman	Helper	p. d. 3 00	Jan. 10, 1876	Kansas	do	
James Cullen	do	p. d. 2 00	June 14, 1881	Michigan	do	Volunteer in the Army.
Frank S. Ratcliffe	Messenger	p. d. 50	Sept. 1, 1881	District of Columbia	do	
Kate Pie	Clerk	p. d. 2 00	May 19, 1875	do	do	
Carrie Allen	do	p. d. 3 25	Nov. —, 1863	do	do	
Elizabeth Clement	do	p. d. 3 00	June 26, 1868	New Jersey	do	
Annie E. Warner	do	p. d. 3 00	Jan. 1, 1871	Vermont	do	
Rebecca O'Neill	do	p. d. 2 50	Mar. 14, 1871	New York	do	
Rebecca Hurley	Helper	p. d. 1 50	Apr. —, 1864	District of Columbia	do	
Alfred H. Jacobs	Laborer	p. d. 1 50	Mar. 1, 1880	Virginia	do	
Julia T. Webster	Picker	p. d. 1 50	Aug. 11, 1880	District of Columbia	do	
Elizabeth A. Altemus	Expert	p. d. 2 00	June 7, 1875	do	do	
Marion Williamson	do	p. d. 2 00	Feb. 8, 1872	Virginia	do	
Emma S. Brown	Examiner	Piece-rates	Apr. 4, 1865	Pennsylvania	do	
Susan Cooper	do	do	Oct. 1, 1869	District of Columbia	do	
Eugenia Davis	do	do	Oct. —, 1869	do	do	
Clara G. Eaton	do	do	Dec. —, 1863	do	do	
Mary Ella Ford	do	do	Nov. 20, 1879	Virginia	do	
Cornelia H. Harvey	do	do	May 1, 1876	Nebraska	do	
Margaret Kelly	do	do	July —, 1864	District of Columbia	do	

Kate B. Kinsey	do	do	Oct. —, 1869	do	do
Florida S. Patten	do	do	Aug. —, 1868	do	do
Mary E. Sullivan	do	do	Dec. —, 1863	Maryland	do
Mary E. Williams	do	do	Oct. 1, 1875	North Carolina	do
Jane R. Turner	do	do	Dec. 1, 1873	Indiana	do
Mary E. Wright	do	do	Jan. 9, 1872	District of Columbia	do
Sarah E. Goddard	Separator and trimmer	do	Sept. 6, 1869	do	do
Catherine A. Griffin	do	do	Aug. 20, 1872	do	do
Elizabeth Keefe	do	do	Oct. —, 1869	Pennsylvania	do
Annie C. Miles	do	do	June 16, 1873	District of Columbia	do
Harriet A. Candy	Box-tender	do	July 14, 1878	Ohio	do
Annie C. Coyle	do	do	Aug. —, 1866	District of Columbia	do
Mary A. McGowne	do	do	Sept. 3, 1878	do	do
Martha E. Shotwell	do	do	May 1, 1879	Illinois	do
Winnie M. Bryan	Counter	do	Nov. 14, 1874	New York	do
Elizabeth Silver	do	do	May 19, 1870	Pennsylvania	do
Annie O. Amery	Numberer	p. d. 1 00	Aug. —, 1881	District of Columbia	do
Jane Bailey	do	Piece-rates	Aug. —, 1867	do	do
Eva Butt	do	do	Jan. 23, 1879	do	do
Julia E. Carroll	do	do	July 14, 1873	do	do
Alice V. Chamberlain	do	do	Sept. 1, 1874	do	do
Ida F. Cross	do	do	Feb. 11, 1873	do	do
Mary L. Carlin	do	do	Dec. 16, 1878	Virginia	do
Nannie E. Chaney	do	do	June 1, 1878	Missouri	do
Emma C. Dinsmore	do	do	Nov. 10, 1873	Maryland	do
Martha J. Divalbiss	do	do	Mar. 9, 1874	Pennsylvania	do
Scotia Douglas	do	do	Sept. 15, 1874	District of Columbia	do
Mary Duffy	do	do	Feb. 4, 1873	California	do
Hattie B. Fridley	do	do	July 28, 1876	District of Columbia	do
Elizabeth A. Gabriel	do	do	Feb. 25, 1875	New York	do
Helen F. Gardiner	do	do	Nov. 30, 1869	Maryland	do
Mary E. Houston	do	do	Mar. 11, 1875	Georgia	do
Minnie Herbert	do	do	July 17, 1878	District of Columbia	do
Emma Hubbard	do	do	Apr. 2, 1870	New York	do
Marion F. Kidwell	do	do	Mar. 27, 1871	District of Columbia	do
Margaret A. Mackey	do	do	Nov. —, 1869	do	do
Rachel E. Miller	do	do	Feb. 22, 1873	West Virginia	do
Mary Anna Mafee	do	p. d. 1. 00	July 7, 1881	New York	do
Ella Osborne	do	Piece-rates	Sept. 23, 1872	District of Columbia	do
Margaret E. Renshaw	do	do	Jan. —, 1879	do	do
Sarah E. Reynolds	do	do	Oct. 8, 1878	do	do
Rose M. Roberts	do	do	Nov. —, 1864	do	do
Elizabeth Robinson	do	do	Apr. 10, 1873	Maryland	do
Emily Rollings	do	do	Dec. —, 1863	District of Columbia	do
Annabel Rose	do	do	Apr. 21, 1874	do	do
Mary R. Schwartz	do	do	June 15, 1874	West Virginia	do
Jessie Scott	do	do	Jan. 19, 1875	Wisconsin	do
Alice C. Stuart	do	do	Feb. 2, 1879	Delaware	do
Edith H. Smart	do	do	Jan. 7, 1879	District of Columbia	do
Delia L. Tune	do	do	Nov. —, 1870	do	do
Ella V. Weedon	do	do	Nov. —, 1869	do	do
Annie L. Winder	do	do	Mar. 8, 1875	Pennsylvania	do

BUREAU OF ENGRAVING AND PRINTING—Continued.

Name.	Grade.	Compensation.	Date of appointment.	State to which charged.	White or colored.	War record.
Lucy Wooden	Numberer	Piece-rates	Sept. 12, 1874	Virginia	White	
Machine Division.						
John Q. Larman	Superintendent	p. d. $6 00	Jan. —, 1863	Virginia	White	
Thomas Bentley	Machinist	p. d. 3 00	June —, 1862	District of Columbia	do	In the Navy,
Xaver Fendrich	do	p. d. 3 50	July —, 1870	do	do	
James E. Hall	do	p. d. 2 75	Sept. 19, 1879	do	do	
Henry E. Riley	do	p. d. 2 50	June 4, 1878	Maryland	do	
J. Thomas Miller	do	p. d. 3 00	May 22, 1877	do	do	In the Navy.
John Reilly	do	p. d. 2 75	Aug. 7, 1879	Wisconsin	do	Michigan Eleventh Infantry.
Albanus L. Kemble	do	p. d. 3 00	July 28, 1880	Pennsylvania	do	Served two years and eight months.
Henry W. Taylor	do	p. d. 2 75	Mar. 16, 1881	Vermont	do	
Robert W. Pentland	Apprentice	p. d. 2 00	Oct. 8, 1878	Pennsylvania	do	
Emil A. Kaiser	do	p. d. 1 60	Nov. 11, 1878	District of Columbia	do	
William T. King	do	p. d. 1 00	Nov. 16, 1878	do	do	
Robert A. Smith	Machinist	p. d. 2 50	Oct. —, 1868	Massachusetts	do	
James Hutchinson	do	p. d. 3 00	Sept. —, 1869	District of Columbia	do	District Volunteers.
William J. Davidson	Machinist	p. d. 2 50	Mar. 23, 1880	Pennsylvania	do	
Nathan L. Chappell	Plumber	p. d. 3 00	Oct. 18, 1880	do	do	Volunteer Army three years and eight months.
James C. Laurie	do	p. d. 2 50	Aug. 4, 1874	District of Columbia	do	
George Wakenight	Blacksmith	p. d. 2 50	Dec. —, 1862	do	do	
John W. Lansdale	Carpenter	p. d. 3 00	Oct. —, 1869	do	do	
John H. Reeves	do	p. d. 2 50	Apr. 29, 1879	do	do	Three months Union Army.
Joseph J. Griffith	Apprentice	p. d. 1 25	Jan. 21, 1880	do	do	
Charles Sizer	do	p. d. 1 00	Jan. 8, 1880	do	do	
George E. Clements	Ink-mill	p. d. 1 00	Jan. 6, 1880	do	do	
John F. Kane	do	p. d. 1 00	Jan. 3, 1880	do	do	
Eppa R. Norris	do	p. d. 1 00	Jan, 15, 1880	Missouri	do	
John W. Koontz	do	p. d. 1 00	Aug. 2, 1880	District of Columbia	do	
Frank Hayes	Rag laundry	p. d. 75	Jan. 2, 1880	do	Colored	
William H. Jurix	do	p. d. 75	Aug. 6, 1879	do	do	
Alphonzo C. Lee	do	p. d. 75	Mar. 5, 1880	do	do	
John H. Jackson	do	p. d. 75	Sept. 1, 1880	do	do	
Levi Jones	Engineer	p. d. 4 00	Sept. 8, 1877	do	White	Volunteer Army three months.
Marvin P. Fisher	do	p. d. 3 00	Dec. —, 1865	do	do	Volunteer Army during war.
John Hess	Fireman	p. d. 2 00	July 1, 1869	do	do	
Thomas Edwards	do	p. d. 2 00	June 11, 1877	Vermont	Colored	Volunteer Army.
Moses Anderson	Laborer	p. d. 1 50	June 17, 1878	Virginia	do	
Charles H. Brown	do	p. d. 1 50	June 4, 1880	District of Columbia	do	
William A. Caldwell	do	p. d. 1 50	Mar. 8, 1880	do	White	Volunteer Army.
Nathaniel M. Coles	do	p. d. 1 50	Nov. 3, 1874	Virginia	Colored	
Thomas W. Dyson	do	p. d. 1 50	June 12, 1880	District of Columbia	do	Volunteer Army.
Edward Hayes	do	p. d. 1 50	Nov. 1, 1879	do	White	

Frederick E. Johnson	do	p. d.	1 50	Feb. 17, 1879	do	Colored	Volunteer Army two years and nine months.
Noah Jackson	do	p. d.	1 50	Jan. 26, 1881	Virginia	do	
James Lawn	do	p. d.	1 50	Mar. 6, 1880	Nebraska	White	Volunteer Army.
James Maher	do	p. d.	2 25	Apr. 19, 1880	District of Columbia	do	
William McAleer	do	p. d.	1 50	June 2, 1880	do	do	
Michael McArdle	do	p. d.	1 50	Nov. 7, 1872	do	do	Volunteer Army five years.
John McKinley	do	p. d.	1 50	Jan. 14, 1878	Pennsylvania	do	Do.
William A. Peters	do	p. d.	1 50	Mar. 4, 1880	District of Columbia	Colored	
Michael Quigley	do	p. d.	2 00	Feb. 25, 1880	do	White	Volunteer Army.
Edward Red	do	p. d.	1 75	Nov. 1, 1878	do	Colored	
William Schooler	do	p. d.	1 50	Jan. 2, 1880	do	do	
James W. Simpson	do	p. d.	2 00	Apr. 26, 1880	do	White	
John R. Saxton	do	p. d.	1 50	May 20, 1880	do	do	
Presley Thornton	do	p. d.	1 50	June 17, 1880	do	Colored	
George W. Thomas	do	p. d.	1 50	June 5, 1880	do	do	
Dabney Walker	do	p. d.	1 50	Feb. 26, 1879	Virginia	do	
William Worrelll	do	p. d.	2 50	Aug. 1, 1879		White	
William L. West	do	p. d.	1 50	Apr. —, 1880	District of Columbia	Colored	
George W. Wise	Helper	p. d.	2 25	Mar. 1, 1872	Ohio	White	Volunteer Army three years and seven months.
Thomas Plunkett	Laborer	p. d.	1 50	June 15, 1881	District of Columbia	do	Volunteer Army.
John E. Dorsey	do	p. d.	1 50	June 22, 1881	Virginia	Colored	
James E. Chapman	Messenger	p. d.	1 00	July 6, 1881	District of Columbia	White	
James Corley	Laborer	p. d.	1 50	July 13, 1881	do	do	
Alphonso M. Boswell	do	p. d.	1 50	June 16, 1870	Maryland	do	
William Levy	do	p. d.	2 25	July 15, 1881	District of Columbia	do	
Joseph O. Crawford	do	p. d.	1 50	Dec. 6, 1880	do	do	
William H. Talbert	do	p. d.	1 50	Aug. 3, 1881	Maryland	Colored	
Henry W. Poole	Helper	p. d.	1 00	Sept. 14, 1881	Georgia	do	
George L. Emerson	Apprentice			Mar. —, 1880	District of Columbia	White	
George H. Ripley	Laborer	p. d.	1 50	Apr. 16, 1880	do	do	
Burgess Brookins	do	p. d.	1 50	Mar. 8, 1880	Virginia	Colored	
John Prender	Helper	p. d.	50	Oct. 1, 1881	Ohio	White	
George N. Herring	Laborer	p. d.	1 50	May 18, 1880	Michigan	do	
Daniel Harrison	Machinist	p. d.	3 00	Oct. 5, 1881	District of Columbia	do	
William McKenzie	Laborer	p. d.	2 00	May 21, 1880	do	do	
Gabriel Duncan	do	p. d.	1 50	June 2, 1880	do	do	Volunteer Army.
James Downs	do	p, d.	1 50	Oct. 13, 1881	do	do	Do.
Mason Lowry	do	p. d.	1 50	Oct. 13, 1881	West Virginia	Colored	
George Hill	do	p. d.	1 50	Oct. 17, 1881	New York	White	Volunteer Army three years.
P. Henry Davis	Helper	p. d.	1 00	Oct. 18, 1881	District of Columbia	do	Volunteer Army.
Charles W. Anderson	Laborer			Oct. 20, 1881	Virginia	Colored	
David M. Moore	Bureau driver	p. d.	2 00	Apr. 27, 1880	Pennsylvania	White	
John E. Borland	Elevator	p. d.	1 50	Sept. 21, 1881	District of Columbia	do	
Watch Division.							
Patrick R. Dailey	Captain	p. d.	4 00	Mar. 26, 1874	Vermont	White	Volunteer Army one year.
George Schwab	Lieutenant	p. d.	3 00	Mar. 6, 1867	District of Columbia	do	Army twenty-one years.
Charles E. Hooks	do	p. d.	3 00	July 4, 1878	Connecticut	do	
William H. Bournes	Watchman	p. d.	2 25	June 14, 1870	Michigan	do	Volunteer Army three years.
Thomas J. Brown	do	p. d.	2 25	Apr. 5, 1880	District of Columbia	do	
Edward Brooks	do	p. d.	2 25	July 1, 1881	Ohio	Colored	Volunteer Army.

BUREAU OF ENGRAVING AND PRINTING—Continued.

Name.	Grade.	Compensation.	Date of appointment.	State to which charged.	White or colored.	War record.
Joseph Casey	Watchman	p. d. $2 25	June 23, 1877	New York	White	Volunteer Army.
Francis A. Carbery	do	p. d. 2 25	July 2, 1877	Illinois	do	Volunteer Army two years.
Charles F. Clark	do	p. d. 2 25	Jan. 12, 1876	District of Columbia	do	Volunteer Army three years.
Wesley W. Crubaugh	do	p. d. 2 25	Mar. 5, 1880	Ohio	do	
Scott Cornell	do	p. d. 2 25	Aug. 4, 1880	do	Colored	Volunteer Army.
William F. Cooper	do	p. d. 2 25	Aug. 25, 1881	Virginia	White	
John W. Ewan	do	p. d. 2 25	Apr. 21, 1879	do	do	
James Garvey	do	p. d. 2 25	Apr. 3, 1879	District of Columbia	do	Volunteer Army three years.
David Gibson	do	p. d. 2 25	Dec. 7, 1862	New York	do	
Frederick Haase	do	p. d. 2 25	July 15, 1872	Massachusetts	do	Army eight years.
Joseph L. Jackson	do	p. d. 2 25	May 17, 1877	Ohio	do	Volunteer Army three years.
Obadiah Kniffens	do	p. d. 2 25	Apr. 19, 1877	New York	do	District Volunteers three months.
John Kroger	do	p. d. 2 25	Jan. 8, 1880	Illinois	do	
Charles W. Procter	do	p. d. 2 25	May 1, 1874	Maryland	Colored	
Edward H. Parker	do	p. d. 2 25	Aug. 16, 1881	Minnesota	White	
Robert Parker	do	p. d. 2 25	Aug. 15, 1881	Wisconsin	Colored	
Walter S. Ridenour	do	p. d. 2 25	Aug. —, 1877	Ohio	White	
John Strapp	do	p. d. 2 25	June 17, 1873	New York	do	Volunteer Army two years and eight months.
Thomas J. Stewart	do	p. d. 2 25	July 8, 1880	Ohio	Colored	Volunteer Army three years.
Charles Zerdahely	do	p. d. 2 25	July 28, 1880	Iowa	White	Volunteer Army.
Henry Piper	do	p. d. 2 25	Mar. 27, 1864	Virginia	Colored	
Theodore S. Slater	do	p. d. 2 25	Sept. 1, 1880	District of Columbia	White	
Miscellaneous.						
Edwin Lamasure	Clerk	p. d. 5 25	Nov. 1, 1877	Pennsylvania	White	
John P. Jefferis	do	p. d. 5 00	May 3, 1877	do	do	Volunteer Army four and one-half years.
Daniel W. Beach	do	p. d. 4 00	Oct. 19, 1877	West Virginia	do	
David M. Davis	do	p. d. 4 00	Sept. 2, 1878	New York	do	
George C. McPherson	do	p. d. 4 00	Oct. 1, 1877	Maryland	do	
Mary C. Roselle	do	p. d. 4 00	Jan. —, 1872	Mississippi	do	
Euphina R. Swift	do	p. d. 4 00	Apr. —, 1872	New York	do	
John A. Pierre	Register clerk	p. d. 3 00	Dec. —, 1863	District of Columbia	Colored	
Frank E. Ferguson	Clerk	p. d. 3 00	Mar. 1, 1878	do	White	
Elizabeth A. Clarkson	do	p. d. 3 00	Aug. 20, 1877	Virginia	do	
Daniel Z. Wilson	do	p. d. 2 50	Sept. 13, 1877	Maryland	do	
Willis I. Crocker	do	p. d. 2 00	Apr. 14, 1880	District of Columbia	do	
Edith C. Edmonston	do	p. d. 2 00	July 18, 1874	Texas	do	
Radie E. Godey	do	p. d. 2 00	Dec. 16, 1880	District of Columbia	do	
Jennie D. Reilly	do	p. d. 2 00	Feb. 1, 1875	Nebraska	do	
Mary J. Meany	do	p. d. 1 50	Apr. 16, 1879	District of Columbia	do	
Frederick L. Siddons	do	p. d. 2 00	Jan. 2, 1879	do	do	
Joseph W. Robinson	do	p. d. 1 50	Dec. 8, 1880	Nebraska	do	
Paul A. Draper	Messenger	p. d. 1 00	Nov. 20, 1878	District of Columbia	do	
John R. Moore	do	p. d. 1 00	Jan. 7, 1881	do	do	

H. H. Douglas	Clerk	p. d.	1 50	June 23, 1881	Ohio ..... do		
Edward E. Perley	..... do	p. d.	2 00	Sept. 6, 1879	District of Columbia .... do		
Hobart H. Brooks	..... do	p. d.	2 50	Aug. 7, 1877	Nebraska ..... do		
Nathan King	Property clerk	p. d.	3 25	May 19, 1879	Pennsylvania ..... do	Volunteer Army.	
George D. Crawford	Storekeeper	p. d.	3 25	May 3, 1880	Maryland ..... do		
Charles J. Towner	Clerk	p. d.	3 25	Feb. 1, 1871	Virginia ..... do		
Edwin H. Start	..... do	p. d.	1 50	Oct. 1, 1879	Maryland ..... do		
Thomas P. Diggins	Waste-paper clerk	p. d.	2 50	Jan. 8, 1869	District of Columbia .... do		
Nannie V. Mitchell	Inspectress	p. d.	2 25	July 1, 1874	.... do ..... do		
Lotta M. Stone	..... do	p. d.	2 25	Sept. 1, 1874	New York ..... do		
Addie S. Clark	..... do	p. d.	2 25	Mar. 15, 1875	Vermont ..... do		
John W. Graves	Telegraph operator	p. d	2 00	June 15, 1880	District of Columbia .... do		
John H. Brodhead	Guide	p. d.	1 50	Jan. 12, 1880	Pennsylvania ..... do		
Samuel H. Colbath	..... do	p. d.	1 50	June 20, 1879	Massachusetts ..... do		
Alexander Test	..... do	p. d.	1 50	1862	Pennsylvania ..... do		
Cornelius Berkeely	Messenger	p. d.	2 00	May 17, 1880	Virginia ..... Colored		
Gusty Phenix	..... do	p. d.	2 00	Dec. 20, 1880	.... do ..... do		
Martin Home	..... do	p. d.	1 50	Jan. 17, 1880	District of Columbia .... do		
William H. Smallwood	..... do	p. d.	1 50	Feb. 27, 1880	... do ..... do		
Louis Patterson	..... do	p. d.	1 50	June 12, 1880	Virginia ..... do		
Thomas Williams	..... do	p. d.	1 50	June 12, 1880	Ohio ..... do		
Theodore S. Ray	..... do	p. d.	1 50	July 7, 1881	New York ..... do	Volunteer Army.	
Edmund Scott	..... do	p. d.	1 50	July 20, 1881	District of Columbia .... do		
John Solinger	Helper	p. d.	1 50	July 7, 1881	... do ..... White		
Milligan steam press.							
James Milligan	Superintendent	p. d.	5 00	May 12, 1879	New York ..... White		
Edgar Baker	Printer	Piece-rates.		Mar. 15, 1864	.... do ..... do	Volunteer Army.	
James Bolter	..... do	.... do		Apr. —, 1863	.... do ..... do		
Edward Hager	..... do	.... do		Aug. —, 1863	District of Columbia .... do		
Edward Lawson	..... do	.... do		Aug. —, 1863	Pennsylvania ..... do		
John P. Swan	..... do	.... do		Nov. —, 1869	Kentucky ..... do		
Thomas H. Little	..... do	.... do		Feb. 26, 1875	New York ..... do	Volunteer Army.	
Minnie Alber	Assistant	p. d.	1 25	Feb. 23, 1874	District of Columbia .... do		
Ella Boston	..... do	p. d.	1 25	Sept. 15, 1880	.... do ..... do		
Mary E. Craig	..... do	p. d.	1 25	Mar. —, 1870	.... do ..... do		
Annie R. Cox	..... do	p. d.	1 25	Oct. 26, 1875	... do ..... do		
Emma Fleming	..... do	p. d.	1 25	July 11, 1881	Pennsylvania ..... do		
Mary Jebb	..... do	p. d.	1 25	June 27, 1873	.... do ..... do		
Ida M. Mutisbaugh	..... do	p. d.	1 25	Oct. 23, 1879	Virginia ..... do		
Mary Amelia Melson	..... do	p. d.	1 25	Oct. 11, 1880	District of Columbia .... do		
Lizzie Seidenspinner	..... do	p. d.	1 25	July 1, 1873	.... do ..... do		
Kate V. Shilleun	..... do	p. d.	1 25	July 7, 1878	.... do ..... do		
Fannie E. Shibblefield	..... do	p. d.	1 25	Oct. 2, 1878	.... do ..... do		
Sarah Small	..... do	p. d.	1 25	July 13, 1877	.... do ..... do		
Annie E. Warren	..... do	p. d.	1 25	Nov. 19, 1878	.... do ..... do		
E. P. Vaux	Laborer	p. d.	1 50	Sept. 19, 1881	New York ..... do		
Cleaning Division.							
Bridget Hannon	Forewomen	p. d.	1 50	Nov. 1, 1879	District of Columbia White		

BUREAU OF ENGRAVING AND PRINTING—Continued.

Name.	Grade.	Compensation.	Date of appointment.	State to which charged.	White or colored.	War record.
Margaret Carr	Dressing-room attendant,	p. d. $1 00	Jan. 17, 1874	District of Columbia	White	
Mary Myles	do	p. d. 1 00	Nov. 2, 1873	do	do	
A. Jennie Miles	do	p. d. 1 00	May 10, 1878	New York	do	
Annie O. Talbott	do	p. d. 1 00	July 30, 1880	Pennsylvania	Colored	
Sarah E. Harwood	do	p. d. 1 00	July 13, 1881	Maryland	White	
Sarah Mockabee	do	p. d. 1 00	Aug. 8, 1881	District of Columbia	Colored	
Day cleaners.						
Sarah Tomelty	Forewoman	p. d. 1 50	July 16, 1862	Massachusetts	White	
Annie E. Philpott	Day cleaner	p. d. 1 00	Aug. 21, 1877	District of Columbia	do	
Elizabeth Wise	do	p. d. 1 00	May —, 1869	do	do	
Ellen Brombrey	do	p. d. 1 00	Oct. 9, 1878	do	Colored	
Emma Bell	do	p. d. 1 00	July 19, 1880	do	do	
Virginia Clark	do	p. d. 1 00	Sept. 1, 1880	do	do	
Bettie Peters	do	p. d. 1 00	July 1, 1879	do	do	
Ella Landon	do		Sept. 9, 1881	Virginia	do	
Evening cleaners.						
Eliza Zimmerman	Forewoman	p. d. 1 50	Mar. 19, 1875	North Carolina	White	
Matilda Augerer	Evening cleaner	p. d. 75	Nov. 22, 1875	District of Columbia	do	
Annie Baulser	do	p. d. 75	July 29, 1880	do	do	
Sydney Bowman	do	p. d. 75	Apr. 1, 1871	do	Colored	
Amanda Grady	do	p. d. 75	Jan. 13, 1873	do	do	
Anna Brooks	do	p. d. 75	Nov. 2, 1878	do	do	
Louisa Fisher	do	p. d. 75	Apr. 11, 1879	do	do	
Charlotte Howard	do	p. d. 75	May 6, 1879	do	do	
Elizabeth Cutter	do	p. d. 75	Nov. 11, 1879	Ohio	do	
Mary Ann Monroe	do	p. d. 75	July 8, 1878	Arkansas	do	
Richardetta Randall	do	p. d. 75	June —, 1880	District of Columbia	do	
Bettie Green	do	p. d. 75	July 27, 1880	do	do	
Elizabeth Bell	do	p. d. 75	July 22, 1880	New York	do	
Charity Johnson	do	p. d. 75	July 23, 1880	District of Columbia	do	
Sophia Scott	do	p. d. 75	Nov. 5, 1878	do	do	
Kate Coffey	do	p. d. 75	Oct. 2, 1879	do	White	
Margaret Grant	do	p. d. 75	Sept. 2, 1872	do	do	
Mary Crittenden	do	p. d. 75	Jan. 21, 1875	Ohio	do	
Adelaine Fountain	do	p. d. 75	Aug. 20, 1880	District of Columbia	Colored	
Martha Delaney	do	p. d. 75	Sept. 11, 1880	Virginia	do	
Alice G. Piper	do	p. d. 75	Dec. 1, 1877	Massachusetts	do	
Sarah Burnett	do	p. d. 75	Dec. 10, 1880	Michigan	White	
Delia Palm	do	p. d. 75	Jan. 12, 1881	District of Columbia	Colored	
Emily Hunter	do	p. d. 75	Jan. 22, 1881	do	do	

Mary R. Butler	..... do	p. d.	75	Feb. 3, 1881	....do	....do .....
Mary Boyd	.....do	p. d.	75	Feb. 24, 1881	....do	White ....
Nancy Welch	.....do	p. d.	75	July 6, 1881	Pennsylvania	Colored ...
Jane McKenney	.....do	p. d.	75	July 6, 1881	Virginia	....do .....
Eliza Robbins	.....do	p. d.	75	Aug. 16, 1881	District of Columbia	White ....
Clara Leonard	.....do	p. d.	75	Oct. 1, 1881	....do	....do .....

OFFICE OF SUPERVISING ARCHITECT.

James G. Hill	Supervising architect		$4,500 00	Aug. 11, 1876	Massachusetts	White	
H. G. Jacobs	Assistant and chief clerk		2,500 00	May 24, 1869	Maine	....do	United States Volunteers three years.
R. H. Thayer	Principal clerk		2,000 00	May —, 1871	Michigan	....do	
George Prince	Photographer		2,000 00	July 1, 1870	District of Columbia	....do	
F. W. Flowers	Clerk, third class		1,600 00	Jan. 10, 1871	Maine	....do	
J. F. Joseph	..... do		1,600 00	Mar. 27, 1865	New York	....do	
Samuel Birdsall	Clerk, first class		1,200 00	Aug. 1, 1881	Wisconsin	....do	United States Volunteer Army two years.
F. A. Civille	.....do		1,200 00	July 19, 1878	California	....do	
Laura R. White	.....do		1,200 00	July 22, 1881	Kentucky	....do	
Faddie K. Brown	Clerk		900 00	May 27, 1869	District of Columbia	....do	
Edmund C. Arnold	Assistant messenger		720 00	Feb. 10, 1863	Massachusetts	....do	United States Volunteer Army ten months.
A. G. Thomson	Inspector of public buildings and chief computer.	p. d.	10 00	Aug. 5, 1871	District of Columbia	....do	
E. G. Church	Inspector of accounts	p. d.	10 00	Sept. 1, 1874	New York	....do	
James P. Low	Civil engineer	p. d.	9 60	June 4, 1877	South Carolina	....do	United States Volunteer Army six years.
H. H. Kendall	Principal draughtsman	p. d.	8 00	Feb. 18, 1879	Massachusetts	....do	
Herbert Vail	Computer	p. d.	8 00	Feb. 8, 1875	Connecticut	....do	
H. C. McLean	.....do	p. d.	6 50	July 19, 1878	New York	....do	
John B. Patterson	Accountants	p. d.	6 50	Nov. 28, 1876	District of Columbia	....do	
Thomas H. Powell	Draughtsman	p. d.	6 50	Aug. 12, 1874	Virginia	....do	
R. H. Atkinson	.....do	p. d.	6 00	Jan. 15, 1879	New Jersey	....do	
Louis Brodhag	.....do	p. d.	6 00	Oct. 1, 1868	District of Columbia	....do	
Achille Collin	Modeler	p. d.	6 00	Aug. 24, 1874	New York	....do	
Edgar H. Klemroth	Draughtsman	p. d.	6 00	Jan. 24, 1879	Pennsylvania	....do	U. S. Vol. Army four and a quarter years.
John J Little	Computer	p. d.	6 00	Oct. 11, 1876	Wisconsin	....do	United States Volunteer Army during war.
James R. Marshall	Draughtsman	p. d.	6 00	Jan. 5, 1871	New Jersey	... do	
J. R. Niernsie, jr	.....do	p. d.	6 00	May 10, 1877	South Carolina	....do	
L. F. Stutz	.....do	p. d.	6 00	June 7, 1872	District of Columbia	....do	
John A. Sutherland	Computer	p. d.	6 00	Jan. 1, 1870	....do	....do	
George M. Wood	Phonographer	p. d.	6 00	Jan. 11, 1873	....do	....do	
Edward T. Avery	Draughtsman	p. d.	5 50	Sept. 10, 1881	Connecticut	....do	United States Volunteer Army four months.
W. J. P. Clarke	Computer	p. d.	5 50	Oct. 11, 1876	District of Columbia	....do	
W. H. Conkle	.....do	p. d.	5 50	July 31, 1877	Pennsylvania	....do	
Cornelius A. Totten	Draughtsman	p. d.	5 50	Feb. 24, 1879	New Jersey	....do	
St. J. B. Dapray	Phonographer	p. d.	5 25	Aug. 7, 1875	South Carolina	....do	
C. Theo. Brentano	Draughtsman	p. d.	5 00	Jan. 23, 1879	Illinois	... do	
William Buhler	Modeler	p. d.	5 00	Apr. 21, 1879	New York	....do	
J. E. Blackwell	Computer	p. d.	5 00	Dec. 8, 1874	Virginia	....do	
T. C. S. Bromwell	.....do	p. d.	5 00	Mar. 1, 1881	Maryland	....do	
Charles Herman	Draughtsman	p. d.	5 00	Jan. 2, 1880	District of Columbia	....do	
C. H. Hansen	Modeler	p. d.	5 00	Mar. 8, 1879	Illinois	....do	

OFFICE OF SUPERVISING ARCHITECT—Continued.

Name.	Grade.	Compensation.	Date of appointment.	State to which charged.	White or Colored.	War record.
F. H. Jackson	Draughtsman	p. d. $5 00	June 20, 1881	New York	White	
Ralph Meriman	do	p. d. 5 00	Sept. 6, 1877	Indiana	do	
Ferd. Moreau	Modeler	p. d. 5 00	May 5, 1881	District of Columbia	do	
Frank W. Pease	Computer	p. d. 5 00	May 10, 1875	Massachusetts	do	
T. W. S. Phelps	Assistant to photographer	p. d. 5 00	Feb. 1, 1873	Maryland	do	
F. W. Smith	Computer	p. d. 5 00	Oct. 23, 1876	New York	do	
C. F. Terney	Draughtsman	p. d. 5 00	Apr. 23, 1879	District of Columbia	do	
Henri Thomas	Modeler	p. d. 5 00	Mar. 10, 1879	New York	do	
A. L. R. Vanden Berghen	do	p. d. 5 00	May 9, 1881	District of Columbia	do	
W. A. Wausleben	Draughtsman	p. d. 5 00	Mar. 20, 1879	do	do	
P. S. Garretson	Computer	p. d. 4 50	May 23, 1876	New Jersey	do	United States Volunteer Army nine months.
J. E. Hosford	Draughtsman	p. d. 4 50	Nov. 13, 1878	Illinois	do	
Frank Milliken	Computer	p. d. 4 50	Feb. 7, 1877	Maine	do	U. S. Volunteer Army two and one-half years.
Robert Stead	Draughtsman	p. d. 4 50	Mar. 9, 1875	New York	do	
F. B. Stryker, jr	do	p. d. 4 50	Feb. 24, 1880	do	do	
A. J. Tolman	do	p. d. 4 50	Apr. 27, 1880	Massachusetts	do	
Ed. O'M. Condon	do	p. d. 4 00	Sept. 16, 1879	Ohio	do	Served in Volunteer Army.
L. J. Fenton	Computer	p. d. 4 00	Jan. 15, 1881	Ohio	do	Do.
E. R. Haight	Assistant to photographer	p. d. 4 00	Jan. 13, 1879	Pennsylvania	do	United States Volunteer Army three years.
C. E. H. Holmes	Mailing clerk	p. d. 4 00	Sept. 17, 1873	Maryland	do	Do.
J. G. Patterson	Computer	p. d. 4 00	Dec. 22, 1877	Massachusetts	do	
George B. Phelps	Draughtsman	p. d. 4 00	Dec. 18, 1875	do	do	
C. S. Kenfield	Locksmith	p. d. 4 00	July 15, 1879	do	do	
Howard Swazey	Computer	p. d. 4 00	July 29, 1881	Maine	do	
J. H. Weirich	do	p. d. 4 00	July 1, 1880	Ohio	do	United States Volunteer Army three years.
Virginia Von Tagen	Clerk	p. m. 100 00	May 7, 1877	Pennsylvania	do	
Benjamin F. Cox	Draughtsman	p. d. 3 50	Feb. 1, 1879	Georgia	do	
DeLancey W. Gill	do	p. d. 3 50	June 1, 1877	South Carolina	do	
V. A. Hubbard	do	p. d. 3 50	Apr. 7, 1877	Ohio	do	
Edgar P. Simons	do	p d. 3 50	July 16, 1877	District of Columbia	do	
Annie P. Adams	do	p. d. 3 00	May 9, 1878	California	do	
J. Goldsborough Bruff	do	p. d. 3 00	Oct. 16, 1876	District of Columbia	do	
Alice V. Bogert	do	p. d. 3 00	Oct. 24, 1872	do	do	
Anna A. Elder	do	p. d. 3 00	Apr. 19, 1879	Pennsylvania	do	
G. A. Emmert	do	p. d. 3 00	Aug. 24, 1881	District of Columbia	do	
Frances M. Richardson	do	p. d. 3 00	May 14, 1877	Maine	do	
H. C. Robinson	Computer	p. d. 3 00	July 1, 1878	District of Columbia	do	
Emma G. Nelson	Draughtsman	p. d. 3 00	Feb. 19, 1879	do	do	
G. Santucci	Molder	p. d. 3 00	Mar. 8, 1879	do	do	
John Dochery	Assistant mailing clerk	p. d. 3 75	Nov. 1, 1871	New Jersey	do	
Henry Johnson	Clerk	1,000 00	Oct. 1, 1877	District of Columbia	Colored	
Annie Bredin	Copyist	900 00	Apr. 25, 1880	Pennsylvania	White	
Josephine E. Crawford	do	900 00	June 1, 1876	Nebraska	do	
Kate P. Dungan	Draughtsman	900 00	May 1, 1879	New York	do	

Mary C. Hazen	Copyist		900 00	Sept. 1, 1879	Mississippi	....do	
Hannah Sanderson	....do		900 00	July 12, 1877	District of Columbia	....do	
Elanora Finley	....do	p. m.	75 00	May 4, 1877	.... do	....do	
Carrie Harding	....do	p. m.	75 00	Aug. 26, 1880	....do	....do	
Mary E. Kail	....do	p. m.	75 00	Jan. 5, 1881	Ohio	....do	
Corilla Smith	....do	p. m.	75 00	Aug. 2, 1881	Maryland	....do	
Sarah E. Wyman	....do	p. m.	75 00	May 1, 1876	Massachusetts	....do	
Margaret Ahern	Laborer	p. d.	2 50	June 1, 1878	Virginia	....do	
Burrill Nixon	Messenger		840 00	Dec. 1, 1873	District of Columbia	Colored	
Frederick R. Moore	....do		840 00	July 1, 1881	.... do	.... do	
S. A. W. Simms	Laborer	p. d.	2 00	July 26, 1881	Virginia	....do	
Harrison Fillmore	....do	p. m.	35 00	July 6, 1881	District of Columbia	....do	United States Volunteer Navy one year.

FIRST COMPTROLLER'S OFFICE.

James Auld	Chief of division	$2,100 00	Oct. 1, 1857	District of Columbia	White	
S. C. Clarke	....do	2,100 00	Jan. 13, 1864	....do	....do	
S. Willard Saxton	....do	2,100 00	July 1, 1869	Massachusetts	.... do	Volunteer Army four years.
Jos. Ad. Thomson	....do	2,100 00	Jan. 4, 1862	Pennsylvania	....do	
H. B. Bennett	Clerk, fourth class	1,800 00	Apr. 22, 1864	Massachusetts	....do	One year in Volunteer Army.
A. J. Chipman	....do	1,800 00	July 1, 1869	Kansas	.... do	
John R. Garrison	....do	1,800 00	Sept. 30, 1863	District of Columbia	....do	
Z. M. Lawrence	....do	1,800 00	Apr. 22, 1864	Mississippi	....do	
John Walker	....do	1,800 00	Jan. 17, 1872	Illinois	....do	
John Arthur	Clerk, third class	1,600 00	Feb. 8, 1879	Pennsylvania	....do	
Samuel Biddle	....do	1,600 00	Jan. 3, 1867	District of Columbia	....do	
E. N. Gilpin	....do	1,600 00	Nov. 29, 1870	Indiana	....do	Three and one-half years in Volunteer Army.
Francis Hammond	....do	1,600 00	Aug. 11, 1875	Ohio	....do	
Isaac Lynch	....do	1,600 00	June 29, 1870	Indiana	....do	
T. J. Minton	....do	1,600 00	May 1, 1878	South Carolina	Colored	
Charles B. Parkman	....do	1,600 00	Sept. 8, 1865	District of Columbia	White	Three years in Volunteer Army.
Thomas Robinson	....do	1,600 00	July 25, 1873	Georgia	....do	
J. H. Wilkinson	....do	1,600 00	July 1, 1869	Ohio	....do	
M. Woodworth	....do	1,600 00	June 10, 1870	Indiana	....do	
Charles E. Bronson	Clerk, second class	1,400 00	Mar. 17, 1880	Michigan	....do	
James H. Day	....do	1,400 00	May 17, 1877	Texas	....do	Volunteer Army about one year.
William Linton	....do	1,400 00	Nov. 30, 1867	District of Columbia	....do	
Frank T. Lodge	....do	1,400 00	June 18, 1878	Indiana	....do	
John E. Parker	....do	1,400 00	Oct. 16, 1878	Arkansas	....do	Volunteer Army two years.
D. C. Pinkerton	....do	1,400 00	Aug. 13, 1877	Ohio	....do	
Leonard Sargeant	....do	1,400 00	Jan. 13, 1874	Missouri	....do	Three years in Volunteer Army.
Allen Wood	....do	1,400 00	Dec. 1, 1877	Georgia	....do	
Ralph Ballin	Clerk, first class	1,200 00	May 1, 1880	Mississippi	....do	
John Caughey	....do	1,200 00	Jan. 21, 1881	Pennsylvania	....do	
Richard T. Greener	....do	1,200 00	July 26, 1877	South Carolina	Colored	
D. A. Grosvenor	....do	1,200 00	Mar. 29, 1880	Ohio	White	Volunteer Army three years.
William Jared Hall	....do	1,200 00	July 2, 1880	.... do	....do	Volunteer Army one year.
Ernest H. May	....do	1,200 00	July 1, 1880	New Jersey	....do	
R. R. McMahon	....do	1,200 00	Sept. 29, 1880	Virginia	....do	
James M. Woulfe	....do	1,200 00	Dec. 11, 1878	New York	....do	

FIRST COMPTROLdER'S OFFICE—Continued.

Name.	Grade.	Compensation.	Date of appointment.	State to which charged.	White or colored.	War record.
Thomas A. Hodgson	Clerk	$1,000 00	Mar. 21, 1881	Georgia	White	
William K. Price	....do	1,000 00	Oct. 9, 1880	North Carolina	Colored	
Mary C. Ringgold	....do	1,000 00	July 1, 1868	South Carolina	White	
Maria F. Bailey	....do	900 00	Mar. 11, 1875	District of Columbia	....do	
Emma Hartwell	....do	900 00	July 1, 1863	Utah Territory	....do	
Kate M. Macomber	....do	900 00	Aug. 3, 1870	Arizona Territory	....do	
Margaretta Murray	....do	900 00	July 1, 1878	Illinois	....do	
Anna S. Parsons	....do	900 00	May 12, 1864	New York	....do	
Mary L. Tayler	....do	900 00	July 1, 1878	Ohio	....do	
Mary S. Wright	....do	900 00	July 1, 1878	Mississippi	....do	
George Martin	Messenger	720 00	Mar. 1, 1868	District of Columbia	Colored	
Thomas Barrett	Laborer	660 00	July 16, 1859	....do	White	
Johnson Green	....do	660 00	Aug. 16, 1880	North Carolina	Colored	
Moses Madry	....do	660 00	July 1, 1880	....do	....do	Volunteer Army three months.

SECOND COMPTROLLER'S OFFICE.

Jerome Lee	Chief of division	$2,100 00	Feb. 1, 1876	Ohio	White	
Benjamin S. Pike	....do	2,100 00	Dec. 7, 1874	Massachusetts	....do	Volunteer Army nine months.
Charles C. Stevens	....do	2,100 00	Feb. 18, 1863	Iowa	....do	
Jared D. Terrill	....do	2,100 00	Apr. 8, 1865	Michigan	....do	Volunteer Army one year and four months.
Alfred Thomas	....do	2,100 00	Dec. 6, 1865	Ohio	....do	
John W. Babbitt	Clerk, fourth class	1,800 00	Sept. 14, 1865	Michigan	....do	Volunteer Army one year and five months.
Roger Bellis	....do	1,800 00	Aug. 3, 1867	Maryland	....do	Volunteer Army four years.
William P. Freeman	....do	1,800 00	May 4, 1864	Maine	....do	
Edmund F. French	....do	1,800 00	Apr. 1, 1848	District of Columbia	....do	
George H. French	....do	1,800 00	Nov. 25, 1867	New Hampshire	....do	Volunteer Army five years and six months.
William G. Green	....do	1,800 00	Apr. 15, 1866	New York	....do	Volunteer Army four years.
Rufus N. Tilton	....do	1,800 00	July 5, 1865	New Hampshire	....do	Volunteer Army eleven months.
Andrew J. Whitaker	....do	1,800 00	Oct. 31, 1867	Illinois	....do	Volunteer Army six months.
Oscar Bielaski	Clerk, third class	1,600 00	July 2, 1867	District of Columbia	....do	Volunteer Army three months.
John H. Brough	....do	1,600 00	Jan. 4, 1870	Maryland	....do	Volunteer Army five years and four months.
De Witt C. Brodhead	....do	1,600 00	June 2, 1865	Pennsylvania	....do	
Arthur R. Burkholder	....do	1,600 00	Mar. 20, 1876	Iowa	....do	
Edward J. Dowling	....do	1,600 00	Dec. 12, 1874	Tennessee	....do	Regular Army three years and seven months.
Charles L. Curtiss	....do	1,600 00	May 17, 1876	Ohio	....do	
Castalio Hosmer	....do	1,600 00	Nov. 18, 1863	District of Columbia	....do	
Thomas Johnson	....do	1,600 00	Aug. 18, 1868	Arkansas	....do	Volunteer Army three months.
Robert J. Mitchell	....do	1,600 00	July 1, 1880	Pennsylvania	....do	Volunteer Army one year and six months.
Philip H. Montague	....do	1,600 00	Nov. 23, 1869	Virginia	....do	
Jacob A. Shindel	....do	1,600 00	Sept. 30, 1869	Pennsylvania	....do	
James A. Underhill	....do	1,600 00	Aug. 20, 1870	New York	....do	

Lucius D. Alden	Clerk, second class	1,400 00	July 1, 1878	Georgia	....do	Volunteer Army two years and ten months.
Peter A. Auer	.....do	1,400 00	May 1, 1875	Michigan	....do	
John C. Brown	.....do	1,400 00	Dec. 15, 1874	Illinois	....do	
Mason Campbell	.....do	1,400 00	July 1, 1847	West Virginia	....do	
Louis Duval	.....do	1,400 00	June 16, 1877	Texas	....do	
Julius A. Frank	.....do	1,400 00	Dec. 11, 1867	Illinois	....do	
Josiah Q. Kern	.....do	1,400 00	June 16, 1877	Ohio	....do	
Henry C. March	.....do	1,400 00	Feb. 1, 1878	.. do	....do	Volunteer Army two years and eleven months.
Samuel B. Parris	.....do	1,400 00	Jan. 29, 1868	District of Columbia	... do	
John W. Reid	.....do	1,400 00	Nov. 21, 1872	Ohio	... do	Volunteer Army one year and four months.
George Redway	.....do	1,400 00	June 16, 1877	Indiana	....do	Volunteer Army two years and ten months.
William A. Saxton	.....do	1,400 00	Aug. 22, 1865	Pennsylvania	....do	
Albert B. White	.....do	1,400 00	July 3, 1880	New Jersey	....do	Volunteer Army three years and seven months.
Thomas C. Carey	Clerk, first class	1,200 00	Nov. 9, 1880	Ohio	....do	Volunteer Army four months.
Charles M. Dougherty	.....do	1,200 00	Oct. 18, 1880	Georgia	....do	
William R. Gass	.....do	1,200 00	May 25, 1877	Illinois	....do	
Julius J. Gutheridge	.....do	1,200 00	Aug. 1, 1881	California	....do	Volunteer Army four months.
George Kent	.....do	1,200 00	Nov. 1, 1871	Maine	....do	
Harold C. Megrew	.....do	1,200 00	Dec. 16, 1880	Ohio	....do	
Preston E. Northup	.....do	1,200 00	July 6, 1880	Illinois	....do	
Laura G. Meehan	.....do	1,200 00	June 27, 1866	District of Columbia	....do	
Anna B. Stapler	.....do	1,200 00	Mar. 13, 1872	Indian Territory	....do	
Ann R. Story	.....do	1,200 00	Oct. 1, 1877	Massachusetts	....do	
Menzo Wixson	.....do	1,200 00	June 2, 1877	New York	....do	Volunteer Army two years.
Elizabeth H. McClery	Clerk	1,000 00	Nov. 9, 1871	District of Columbia	....do	
Annie H. Roberts	.....do	1,000 00	July 1, 1864	Vermont	....do	
Frederica B. Wilson	.....do	1,000 00	Mar. 3, 1866	New Hampshire	....do	
Sarah G. Anderson	Copyist	900 00	Nov. 25, 1863	Mississippi	....do	
Mrs. Clara Byrne*	.....do	900 00	May 1, 1881	....do	....do	
Elizabeth L. Banes	.....do	900 00	July 2, 1881	Kansas	....do	
Miss Eveline Caven*	.....do	900 00	July 8, 1881	Indiana	....do	
Helen Durfee	.....do	900 00	Nov. 1, 1881	Minnesota	....do	
Lydia Fletcher	.....do	900 00	Apr. 19, 1875	South Carolina	....do	
Agnes C. Houston	.....do	900 00	Mar. 11, 1864	District of Columbia	....do	
Clara Ingersoll	.....do	900 00	Feb. 24, 1868	Maine	....do	
Mary E. Ogden	.....do	900 00	July 2, 1877	Oregon	....do	
E. Jennie Stevens	.....do	900 00	July 1, 1878	Wisconsin	....do	
Carrie Tompkins	.....do	900 00	July 25, 1873	District of Columbia	....do	
Jacob Lyon	Messenger	840 00	July 1, 1865	....do	....do	Second United States Regular Artillery.
Arthur L. Bailhache	Laborer	660 00	Mar. 1, 1877	Illinois	....do	
James H. Jones	.....do	660 00	Nov. 1, 1871	District of Columbia	Colored	
John C. Norwood	.....do	660 00	Aug. 16, 1880	North Carolina	....do	

OFFICE OF THE COMMISSIONER OF CUSTOMS.

Albert Miller	Chief of division	2,100 00	Jan. 14, 1864	Pennsylvania	White	
Samuel McDonald	.....do	2,100 00	Aug. 5, 1869	Ohio	....do	Volunteer Army four years.

*Employed and paid from lapse fund.

OFFICE OF THE COMMISSIONER OF CUSTOMS—Continued.

Name.	Grade.	Compensation.	Date of appointment.	State to which charged.	White or colored.	War record
Benjamin F. Cutter	Clerk, fourth class	$1,800 00	Jan. 20, 1871	Minnesota	White	
Niles H. Thompson	do	1,800 00	Dec. 27, 1867	Michigan	do	
J. Harry Danforth	Clerk, third class	1,600 00	June 2, 1866	New York	do	Volunteer Army three years.
John A. Doyle	do	1,600 00	Jan. 29, 1866	Pennsylvania	do	Volunteer Army during Rebellion.
George W. L. Kidwell	do	1,600 00	Aug. 24, 1857	West Virginia	do	
Dan Weed	do	1,600 00	—— —, 1863	Massachusetts	do	
James A. Babson	Clerk, second class	1,400 00	July 1, 1872	Maine	do	
Basil M. Brodie	do	1,400 00	Jan. 12, 1874	Maryland	do	
John T. Bivins	do	1,400 00	May 27, 1877	Georgia	do	Army six months.
Walter L. Clift	do	1,400 00	Jan. 1, 1872	do	do	
Robert G. Cunningham	do	1,400 00	Dec. —, 1864	Virginia	do	Volunteer Army one year and eleven months.
Amos J. Gunning	do	1,400 00	June 25, 1867	Massachusetts	do	Volunteer Army one year and seven months.
John L. Heupel	do	1,400 00	Feb. 10, 1875	New York	do	Volunteer Army three years.
Alvin M. Mothershead	do	1,400 00	July 10, 1877	Indiana	do	
Thomas M. Redd	do	1,400 00	July 10, 1869	Kentucky	do	
Charles L. Williams	do	1,400 00	Aug. 7, 1867	District of Columbia	do	Volunteer Army three months.
Egbert G. Barnard	Clerk, first class	1,200 00	Mar. 1, 1879	Michigan	do	Volunteer Army two years.
James A. Clark	do	1,200 00	Feb. 16, 1878	New York	do	Volunteer Army three years.
Richard Crowther	do	1,200 00	Mar. 1, 1878	Kentucky	do	
George W. Hines	do	1,200 00	Nov. 21, 1861	District of Columbia	do	Volunteer Army three months.
Robert Johnston	do	1,200 00	Sept. 1, 1874	do	do	
Karl L. Kimball	Clerk, first class	1,200 00	Apr. 20, 1869	District of Columbia	do	Volunteer Army four years.
Rollin H. Kirk	do	1,200 00	Aug. 1, 1877	South Carolina	do	
John Pestell	do	1,200 00	June 1, 1878	Missouri	do	Volunteer Army four years.
Guy W. Wines	do	1,200 00	July 1, 1878	Tennessee	do	
James B. Carter	Clerk	1,000 00	Sept. 25, 1880	New Mexico	do	
Martha E. Meloy	do	1,000 00	July 1, 1880	Iowa	do	
Alexander Marshall	Assistant messenger	720 00	Aug. 10, 1864	District of Columbia	Colored	Volunteer Army two years and six months.
John G. B. Marshall	Laborer	660 00	Nov. 18, 1873	Pennsylvania	do	
Lapse.						
Clara L. Willard	Clerk, $900 class	900 00	Oct. 16, 1880	Wisconsin	White	

OFFICE OF THE FIRST AUDITOR.

J. P. Bentley	Chief of division	2,000 00	Feb. 1, 1853	Virginia	White.	
A. F. McMillan	do	2,000 00	Mar. 31, 1866	District of Columbia	do	Volunteer Army four years.
William P. Marsh	do	2,000 00	Jan. 10, 1866	do	do	Volunteer Army three years and one month.
Thad Sturgis	do	2,000 00	Apr. 20, 1863	do	do	
H. C. Dailey	Clerk, fourth class	1,800 00	May 17, 1865	Connecticut	do	
W. D. Dana	do	1,800 00	Sept. 24, 1864	Maine	do	

J. J. Hawkins	Clerk, fourth class	1,800 00	Mar. 29, 1867	Indiana	do	Volunteer Army four months.
W. H. Lemon	do	1,800 00	Aug. 24, 1869	District of Columbia	do	
E. S. Pollock	do	1,800 00	Jan. 10, 1872	Pennsylvania	do	Volunteer Army three months.
G. E. W. Sharretts	do	1,800 00	May 28, 1857	do	do	
H. C. Stier	do	1,800 00	Sept. 13, 1867	District of Columbia	do	
J. H. Bartlett	Clerk, third class	1,600 00	Aug. 4, 1855	do	do	
T. S. Chappell	do	1,600 00	July 15, 1869	Maryland	do	
M. J. Foote	do	1,600 00	Dec. 8, 1874	Ohio	do	Volunteer Army three years.
P. W. Forney	do	1,600 00	Nov. 15, 1869	Pennsylvania	do	
A. S. Griswold	do	1,600 00	Jan. 25, 1869	District of Columbia	do	
A. B. Jameson	do	1,600 00	July 19, 1865	Pennsylvania	do	Three years.
William McFeely	do	1,600 00	Nov. 10, 1868	District of Columbia	do	
J. P. Torbert	do	1,600 00	May 21, 1867	do	do	
C. E. Town	do	1,600 00	Nov. 7, 1872	New York	do	
Douglas Binns	Clerk, second class	1,400 00	July 26, 1873	Illinois	do	Volunteer Army two years.
James Blake	do	1,400 00	Apr. 4, 1878	Kansas	do	
A. M. Kanouse	do	1,400 00	July 14, 1877	Wisconsin	do	Volunteer Army about four years.
C. C. Lancaster, jr	do	1,400 00	Oct. 15, 1875	Maryland	do	
John Love	do	1,400 00	June 5, 1876	Arkansas	do	
Hector McNeill	do	1,400 00	Jan. 28, 1875	Missouri	do	
J. H. Parsons	do	1,400 00	Apr. 10, 1875	Alabama	do	
C. J. Tryon	do	1,400 00	Aug. 1, 1878	New York	do	
Thomas K. Wallace	do	1,400 00	Aug. 15, 1855	District of Columbia	do	
George W. Wheeler	do	1,400 00	Feb. 1, 1876	New Jersey	do	
Edward Baltzley	Clerk, first class	1,200 00	Feb. 1, 1881	Ohio	do	
Robert Bell, jr	do	1,200 00	July 8, 1880	Virginia	do	
T. A. Berryhill	do	1,200 00	Jan. 4, 1881	Missouri	do	
J. W. Bradford	do	1,200 00	Aug. 1, 1878	Texas	do	Volunteer Army during the entire war.
J. G. Burrill	do	1,200 00	July 2, 1880	Indiana	do	Volunteer Army two years.
D. S. Curtiss	do	1,200 00	July 1, 1880	Michigan	do	Volunteer Army three years and two months.
Z. T. Daniels	do	1,200 00	July 1, 1880	Alabama	do	
George W. Fales	do	1,200 00	July 1, 1848	Maine	do	
W. G. Finney	do	1,200 00	June 17, 1861	Ohio	do	
C. H. Guthrie	do	1,200 00	Feb. 2, 1878	Tennessee	do	
George Hartwell	do	1,200 00	Sept. 2, 1851	District of Columbia	do	
E. G. Haywood, jr	do	1,200 00	Apr. 17, 1879	North Carolina	do	
D. F. Myers	do	1,200 00	Apr. 1, 1881	Georgia	do	
Fred. Pfaff	do	1,200 00	Apr. 24, 1864	Pennsylvania	do	two years.
S. R. Smith	do	1,200 00	July 1, 1869	Illinois	do	
J. M. Wells	do	1,200 00	Mar. 15, 1881	Mississippi	do	Volunteer Army three years.
J. W. Butcher	Clerk	1,000 00	Feb. 1, 1869	District of Columbia	Colored	Volunteer Navy three years.
B. C. Sommerville	do	1,000 00	Sept. 20, 1872	do	White	
Z. E. Thomas	do	1,000 00	May 15, 1877	Alabama	do	Volunteer Army four years.
Miss F. A. Austin	Copyist	900 00	July 1, 1880	Louisiana	do	
Miss H. S. Cilley	do	900 00	Sept. 30, 1880	New Jersey	do	
Mrs. M. V. L. Moore	do	900 00	May 16, 1878	Kentucky	do	
Mrs. L. W. Egleston	Counter	900 00	July 1, 1880	New York	do	
Miss H. A. Emery	do	900 00	Sept. 15, 1873	Maine	do	
Abram C. Chew	Assistant messenger	720 00	Jan. 25, 1876	South Carolina	Colored	
Cornelius Brosnahan	do	720 00	Sept. 15, 1859	District of Columbia	White	
H. J. Clark	Laborer	660 00	Apr. 25, 1879	Iowa	do	

[OFFICE OF THE FIRST AUDITOR—Continued.

Name.	Grade.	Compensation.	Date of appointment.	State to which charged.	White or colored.	War record.
J. T. Harris	Laborer	$660 00	June 1, 1878	Alabama	Colored	
Employed and paid from lapse fund.						
Henry F. Keyser	Copyist	900 00	June 1, 1881	West Virginia	White	

OFFICE OF THE SECOND AUDITOR.

Thomas C. Bailey	Chief of division	$2,000 00	Mar. 21, 1864	Pennsylvania	White	
Francis H. Goodall	do	2,000 00	May 18, 1864	New Hampshire	do	Volunteer Army one year and nine months.
Thomas Rathbone	do	2,000 00	Apr. 1, 1865	District of Columbia	do	Volunteer Army two years and eleven months.
Henry A. Whallon	do	2,000 00	Aug. 1, 1863	Virginia	do	
Ambrose F. Wight	do	2,000 00	Feb. 26, 1863	Maine	do	
Henry L. Wilson	Disbursing clerk	1,800 00	Sept. 11, 1867	New Jersey	do	
Joseph Barton	Clerk, fourth class	1,800 00	Feb. 16, 1863	New York	do	
Solomon E. Faunce	do	1,800 00	Feb. 11, 1865	Massachusetts	do	Volunteer Army nine months.
Charles Lowell	do	1,800 00	Dec. 15, 1864	Maine	do	Volunteer Army three years and two months.
Francis H. Morgan	Clerk, fourth class	1,800 00	Dec. 10, 1862	New Hampshire	do	
James F. Parker	do	1,800 00	Oct. 13, 1864	do	do	Volunteer Army ten months.
Horace L. Piper	do	1,800 00	Apr. 22, 1865	Maine	do	Volunteer Army two years and nine months.
Charles C. Snow	do	1,800 00	May 20, 1869	New York	do	
Thomas C. Taylor	do	1,800 00	Mar. 17, 1864	Ohio	do	
Washington L. Wood	do	1,800 00	Mar. 27, 1867	Illinois	do	Volunteer Army three years and four months.
Jesse Arnold	Clerk, third class	1,600 00	May 25, 1866	Ohio	do	Volunteer Army one hundred days.
Samuel Baxter	do	1,600 00	Oct. 23, 1865	Massachusetts	do	Volunteer Army two years and ten months.
Edgar I. Booraem	do	1,600 00	July 18, 1864	New Jersey	do	Volunteer Army three months.
John G. Buxman	do	1,600 00	Apr. 25, 1862	Tennessee	do	
Rollinson Colburn	do	1,600 00	Nov. 5, 1863	Maryland	do	
George G. Colby	do	1,600 00	July 5, 1864	New York	do	Volunteer Army one year.
John T. De Ford	do	1,600 00	Feb. 23, 1864	District of Columbia	do	
Benjamin Eglin	do	1,600 00	Oct. 13, 1864	Pennsylvania	do	
William F. Farish	do	1,600 00	July 14, 1862	Maryland	do	
Orange S. Firmin	do	1,600 00	Nov. 13, 1865	Connecticut	do	Volunteer Army three years.
Henry A. Higgins	do	1,600 00	July 12, 1864	Maine	do	
Thomas P. Keene	do	1,600 00	Oct. 7, 1863	do	do	Volunteer Army one year and eight months.
Henry Krauskopf	do	1,600 00	Apr. 8, 1864	Indiana	do	
William W. Lesh	do	1,600 00	Sept. 20, 1865	Pennsylvania	do	Volunteer Army three years.
Daniel F. Merrill	do	1,600 00	Feb. 10, 1865	New Hampshire	do	
William A. Moorhead	do	1,600 00	Apr. 18, 1863	Maine	do	

Caleb Parkinson	do	1,600 00	Oct. 15, 1863	Michigan	do	
George B. Patch	do	1,600 00	June 2, 1863	District of Columbia	do	
John Q. A. Pfeiffer	do	1,600 00	Dec. 1, 1865	Pennsylvania	do	Volunteer Army one year and two months.
Claudius B. Smith	do	1,600 00	July 2, 1864	Vermont	do	Volunteer Army one year and one month.
John J. Stephens	do	1,600 00	Sept. 8, 1865	New York	do	Volunteer Army one year.
Erastus H. Taylor	do	1,600 00	Mar. 10, 1864	New Jersey	do	Do.
John H. Thompson	do	1,600 00	Feb. 10, 1863	District of Columbia	do	Volunteer Army two years and two months.
Malverd C. Tucker	do	1,600 00	Mar. 6, 1865	Vermont	do	Volunteer Army three years.
Madison Whipple	do	1,600 00	July 17, 1867	New York	do	Volunteer Army one year and nine months.
Alexander D. Willard	do	1,600 00	June 15, 1866	Maine	do	
Nicholas E. Young	do	1,600 00	Aug. 7, 1866	New York	do	Volunteer Army two years and ten months.
Thomas G. Allen	Clerk, second class	1,400 00	Apr. 1, 1866	Pennsylvania	do	Volunteer Army one year and six months.
William P. Andrews	do	1,400 00	Apr. 21, 1868	Indiana	do	Volunteer Army three years.
John B. Atkinson	do	1,400 00	Jan. 21, 1865	Illinois	do	
Edwin J. Barden	do	1,400 00	Mar. 12, 1868	Connecticut	do	Volunteer Army three years.
Stephen M. Bartlett	do	1,400 00	July 29, 1871	Alabama	do	
Bernard Breithaupt	do	1,400 00	Oct. 19, 1863	Ohio	do	
Desevignia S. Burnham	do	1,400 00	July 18, 1864	New Hampshire	do	
Thomas Calver	do	1,400 00	June 15, 1871	Nebraska	do	Velunteer Army four months.
John H. Carmiencke	do	1,400 00	Nov. 11, 1872	New York	do	Volunteer Army nine months.
Cornelius G. Conover	do	1,400 00	Dec. 9, 1869	District of Columbia	do	Volunteer Army one year.
Eliakim L. Corbin	do	1,400 00	Nov. 4, 1869	do	do	Volunteer Army one year and three months.
George G. Cornish	do	1,400 00	May 13, 1865	New York	do	Volunteer Army three years and seven months.
Edward R. Cunningham	do	1,400 00	Mar. 26, 1866	Maine	do	Volunteer Army one year and ten months.
Ward W. Deniston	do	1,400 00	July 1, 1877	Colorado	do	Volunteer Army three years and two months.
Michael A. Dillon	do	1,400 00	July 2, 1866	New Hampshire	do	Volunteer Army three years and five months.
William A. Farlee	do	1,400 00	Mar. 26, 1866	Virginia	do	Volunteer Army two years and ten months.
Edward Fitzki	do	1,400 00	July 3, 1869	Pennsylvania	do	Volunteer Army three years and seven months.
Charles M. Floyd	do	1,400 00	July 10, 1866	Massachusetts	do	Volunteer Army five years.
Benjamin F. Ford	do	1,400 00	Mar. 27, 1863	Colorado	do	
John B. Foster	do	1,400 00	Sept. 18, 1865	Ohio	do	Volunteer Army three years and ten months.
William M. French	do	1,400 00	Apr. 13, 1868	New Hampshire	do	
Samuel S. Gardner	do	1,400 00	Mar. 28, 1872	Alabama	do	Volunteer Army one year and six months.
Vernon Harrington	do	1,400 00	Sept. 16, 1862	District of Columbia	do	
Samuel P. Haverfield	do	1,400 00	Oct. 1, 1865	Ohio	do	Volunteer Army one year and four months.
Richard P. Henderson	do	1,400 00	Oct. 11, 1879	do	Colored	
Homer T. Hirst	do	1,400 00	Apr. 1, 1863	Virginia	White	
Alfred Horton	do	1,400 00	Jan. 6, 1872	Massachusetts	do	
Martin V. Hottel	do	1,400 00	Jan. 10, 1866	Indiana	do	Volunteer Army three years and six months.
Gilbert M. Husted	do	1,400 00	Jan. 1, 1878	Louisiana	do	Do.
John H. B. Jenkins	do	1,400 00	Apr. 8, 1868	Pennsylvania	do	Do.
Manderville G. Lee	do	1,400 00	Sept. 1, 1877	Indiana	do	
Thomas Little	do	1,400 00	Apr. 1, 1865	Maine	do	Volunteer Army two years.
John W. Llufrio	do	1,400 00	Sept. 26, 1870	Virginia	do	
George Lunney	do	1,400 00	Dec. 15, 1871	South Carolina	do	
Josiah McLeod	do	1,400 00	July 24, 1866	Iowa	do	Volunteer Army two years and nine months.
Elias Mann	do	1,400 00	Feb. 2, 1872	Ohio	do	
John Mather	do	1,400 00	Aug. 19, 1863	Pennsylvania	do	
Ames F. Medford	do	1,400 00	Aug. 10, 1869	Ohio	do	Volunteer Army three years and six months.
James H. Meriwether	do	1,400 00	May 21, 1877	Kentucky	Colored	
Charles A. Metcalf	do	1,400 00	July 2, 1869	Maine	White	Volunteer Army four years.
John Morrison	do	1,400 00	July 17, 1865	New Jersey	do	Volunteer Army ten months.

OFFICE OF THE SECOND AUDITOR—Continued.

Name.	Grade.	Compensation.	Date of appointment.	State to which charged.	White or colored.	War record.
Edwin Muller	Clerk, second class	$1.400 00	Jan. 19, 1874	New Jersey	White	
John T. Neely	do	1,400 00	July 11, 1866	Kentucky	do	
James B. Osgood	do	1,400 00	Jan. 31, 1863	District of Columbia	do	
James H. Pierce	do	1,400 00	Aug. 17, 1877	Mississippi	do	
Aaron Pinney	do	1,400 00	Aug. 31, 1869	Iowa	do	Volunteer Army one year and eleven months.
Lucien N. Prescott	do	1,400 00	May 27, 1871	Maine	do	
Thomas H. Rawson	do	1,400 00	Mar. 21, 1863	New York	do	
Charles E. Rice	do	1,400 00	Jan. 2, 1874	Massachusetts	do	
Ashbel W. Riley	do	1,400 00	Dec. 23, 1863	New York	do	
George N. Roberts	do	1,400 00	Sept. 23, 1863	Maryland	do	
Amory H. Shattuck	do	1,400 00	Sept. 10, 1870	Massachusetts	do	Volunteer Army two years and six months.
George W. Street	do	1,400 00	Sept. 18, 1865	New York	do	Volunteer Army three years and three months.
Samuel N. Thorne	do	1,400 00	Feb. 6, 1868	New Jersey	do	
George W. Walter	do	1,400 00	Jan. 8, 1870	New York	do	
Konrad Weiss	do	1,400 00	Aug. 27, 1863	do	do	Volunteer Army two years.
Huylar Z. Wells	do	1,400 00	Feb. 22, 1867	do	do	
Newton Whitten	do	1,400 00	July 2, 1869	Maine	do	Volunteer Army five years.
Orrin Wilcox	do	1,400 00	June 22, 1864	New York	do	
Alexander Williamson	do	1,400 00	Apr. 1, 1863	District of Columbia	do	
Nathaniel M. Ambrose	Clerk, first class	1,200 00	Mar. 19, 1880	Wyoming	do	Volunteer Army three years and eight months.
Robert P. Barbour	do	1,200 00	July 8, 1875	Michigan	do	Volunteer Army three years.
Richard T. Birchett	do	1,200 00	Feb. 8, 1861	Florida	do	
Julian F. Boiseau	do	1,200 00	Nov. 17, 1869	District of Columbia	do	
Peter H. Burghardt	do	1,200 00	Oct. 11, 1876	New York	do	Volunteer Army three years and three months.
Finley H. Calvert	do	1,200 00	Nov. 16, 1880	Louisiana	do	
Frank A. Clark	do	1,200 00	May 19, 1880	Iowa	do	Volunteer Army one year and nine months.
George T. Dickinson	do	1,200 00	June 19, 1862	New York	do	
Alexander R. Doone	do	1,200 00	Mar. 25, 1880	Virginia	do	
Ambrose J. Faust	do	1,200 00	Sept. 1, 1876	Mississippi	do	
John Gilmore	do	1,200 00	Aug. 8, 1867	Pennsylvania	do	Volunteer Army three years.
Frederick W. Grossart	do	1,200 00	Aug. 26, 1880	California	do	Volunteer Army three years and ten months.
Cyrus D. Hanks	do	1,200 00	June 15, 1871	Michigan	do	
George H. Hill	do	1,200 00	Aug. 1, 1880	do	do	
Emerson Hodges	do	1,200 00	Feb. 24, 1864	Minnesota	do	
Stuart L. Johnston	do	1,200 00	Mar. 26, 1880	North Carolina	do	
Henry J. Kimball	do	1,200 00	Mar. 8, 1869	Maine	do	Volunteer Army two years and seven months.
Joseph F. Kirkland	do	1,200 00	Feb. 1, 1881	Wisconsin	do	
Thomas G. Lewis	do	1,200 00	Apr. 8, 1879	Ohio	do	
Henry C. Lovell	do	1,200 00	July 23, 1879	Illinois	do	Army.
Walter Manton	do	1,200 00	Feb. 12, 1881	Rhode Island	do	
Henry W. Mendenhall	do	1,200 00	Aug. 1, 1877	Indiana	do	
Homer M. Morrison	do	1,200 00	July 5, 1881	do	do	
Charles V. Patrick	do	1,200 00	Feb. 1, 1880	Illinois	do	Volunteer Army six months.
Henry A. Pond	do	1,200 00	Feb. 1, 1878	Iowa	do	

Samuel Ramey	do	1,200 00	Feb. 5, 1880	Pennsylvania	do	Volunteer Army ten months.
Reuben S. Smith	do	1,200 00	Apr. 1, 1880	Florida	Colored	
Thomas H. Speir	do	1,200 00	Dec. 8, 1863	New York	White	
Joseph J. Stutzman	do	1,200 00	Apr. 3, 1867	Pennsylvania	do	
Henry H. Swearingen	do	1,200 00	Dec. 14, 1880	Georgia	do	
David H. Taylor	do	1,200 00	Apr. 3, 1880	Tennessee	do	
John W. E. Thomas	do	1,200 00	Mar. 17, 1881	Illinois	Colored	
Richard W. Tompkins	do	1,200 00	Mar. 20, 1880	Mississippi	do	
John H. Wickizer	do	1,200 00	Apr. 11, 1879	Illinois	White	Volunteer Army two years and eight months.
Willis B. Wilcox	do	1,200 00	Feb. 1, 1880	Iowa	do	
William M. Ferguson	Clerk	1,000 00	Jan. 16, 1878	New York	do	Volunteer Army fifteen days.
Charles W. Forrest	do	1,000 00	Dec. 1, 1835	District of Columbia	do	
Robert P. W. Garnett	do	1,000 00	May 3, 1879	Virginia	do	
William K. Hammond	do	1,000 00	Mar. 17, 1880	North Carolina	do	Volunteer Army three years and four months.
Thomas S. Kelly	do	1,000 00	Apr. 28, 1880	Louisiana	Colored	Volunteer Army five years and nine months.
Hamilton O. Moore	do	1,000 00	Nov. 5, 1869	New Hampshire	White	
William H. Richards	do	1,000 00	July 1, 1881	Tennessee	Colored	
Henry C. Shute	do	1,000 00	Oct. 1, 1878	New York	White	Volunteer Army four years.
Travres B. Pinn	Assistant messenger	720 00	Mar. 18, 1880	Virginia	Colored	
Mrs. Lizzie G. Wesselle*	do	720 00	Aug. 20, 1881	Wisconsin	White	
Albert H. Catlett	Laborer	660 00	Apr. 7, 1873	District of Columbia	Colored	
Mrs. Caroline Crawley*	do	660 00	Feb. 7, 1881	Kansas	White	
Miss Annie Foster*	do	660 00	Aug. 26, 1881	Minnesota	do	
William O. Holmes	do	660 00	Sept. 7, 1881	Michigan	Colored	Volunteer Army two years.
George W. Le Vere	do	660 00	Sept. 8, 1881	Tennessee	do	
John H. Nichols	do	660 00	Aug. 3, 1863	District of Columbia	do	
Thomas O'Connell	do	660 00	Sept. 16, 1881	Texas	White	
Samuel L. Perry	do	660 00	Oct. 1, 1880	North Carolina	Colored	
Charles Sherwood	do	660 00	Oct. 11, 1880	Georgia	White	Volunteer Army four years and five months.
Albert H. Walcott	do	660 00	Mar. 1, 1873	Massachusetts	do	
Mrs. Mary A. Grant*	do	660 00	Oct. 5, 1881	Wisconsin	do	

OFFICE OF THE THIRD AUDITOR.

Andrew Cauldwell	Chief of division	$2,000 00	Apr. 23, 1862	New York	White	
Judson F. Jones	do	2,000 00	May 3, 1861	Missouri	do	
Wyllys S. Stetson	do	2,000 00	Oct. 23, 1863	Ohio	do	Volunteer Army three months.
Isaac S. Tichenor	do	2,000 00	June 11, 1864	District of Columbia	do	Volunteer Army one year and five months.
W. H. Whitney	do	2,000 00	Mar. 23, 1865	New Hampshire	do	
J. M. Vale	In charge of division	1,800 00	July 9, 1866	Iowa	do	Volunteer Army six months.
True E. G. Pettengill	do	1,800 00	Nov. 10, 1863	New York	do	
John C. Baxter	Clerk, fourth class	1,800 00	June 11, 1864	Ohio	do	Volunteer Army four months.
George Doolittle	do	1,800 00	June 20, 1865	Iowa	do	
James Printz	do	1,800 00	June 19, 1865	Pennsylvania	do	
J. R. Thompson	do	1,800 00	June 11, 1864	Vermont	do	Volunteer Army nine months.
Henry Casey	Clerk, third class	1,600 00	Sept. 21, 1868	Massachusetts	do	Regular Army two years.
W. N. Chamberlin	do	1,600 00	Sept. 18, 1865	Pennsylvania	do	Volunteer Army three years.
F. S. Deland	do	1,600 00	July 1, 1865	Maine	do	Do.

*Employed and paid from lapse fund.

OFFICE OF THE THIRD AUDITOR—Continued.

Name.	Grade.	Compensation.	Date of appointment.	State to which charged.	White or colored.	War record.
W. H. Gaines	Clerk, third class	$1,600 00	Sept. 22, 1864	Ohio	White	Volunteer Army one year.
Charles T. Gardner	do	1,600 00	May 19, 1869	District of Columbia	do	Volunteer Army three years.
T. S Johnes	do	1,600 00	Dec. —, 1868	Illinois	do	
C. E. Lewis	do	1,600 00	July —, 1866	New York	do	Volunteer Army three years.
Thomas H. Martin	do	1,600 00	Sept. 16, 1864	Pennsylvania	do	Volunteer Army two years.
N. C. Martin	do	1,600 00	July 12, 1865	New York	do	Volunteer Army two years and eleven months.
M. D. Montis	do	1,600 00	Mar. —, 1866	Ohio	do	Volunteer Army five months.
D. F. McGowan	do	1,600 00	Mar. —, 1866	District of Columbia	do	Volunteer Army three years and one month.
S. H. Robison	do	1,600 00	Apr. —, 1869	Ohio	do	
W. B. Shaw	do	1,600 00	May 17, 1866	Maine	do	Volunteer Army two years.
R. C. Stickney	do	1,600 00	Mar. 7, 1863	do	do	Volunteer Army seven months.
Theo. F. Swayze	do	1,600 00	Apr. 20, 1869	New Jersey	do	Volunteer Army one year and six months.
Benjamin F. Worrell	do	1,600 00	June —, 1866	do	do	Volunteer Army two years.
John C. Ayers	Clerk, second class	1,400 00	Jan. 14, 1879	Ohio	do	Volunteer Army two years; lost a leg.
John R. Brown	do	1,400 00	Oct. 18, 1864	West Virginia	do	
I. H. Benedict	do	1,400 00	June 20, 1865	New York	do	
Harrison M. Bennett	do	1,400 00	June 17, 1865	Massachusetts	do	Volunteer Army two years and seven months.
Benjamin F. Bingham	do	1,400 00	June 3, 1865	Maryland	do	Volunteer Army two years and ten months.
Augustus S. Bryan	do	1,400 00	Dec. 23, 1866	Pennsylvania	do	Navy two years.
J. W. Clark	do	1,400 00	Apr. —, 1869	New Hampshire	do	
George T. Carter	do	1,400 00	Aug. —, 1869	do	do	Volunteer Army four years.
Clarke P. Crandall	do	1,400 00	June 16, 1877	Oregon	do	Volunteer Army one year.
John R. Collette	Clerk, second class	1,400 00	Mar. —, 1868	Kentucky	do	Volunteer Army three years.
C. E. Carter	do	1,400 00	July 9, 1877	Indiana	do	Navy two years.
Lewis G. Close	do	1,400 00	July 1, 1876	Georgia	do	Nine months a prisoner.
Andrew S. Dunn	do	1,400 00	Nov. —, 1867	Virginia	do	Navy two months.
Frederick B. Dalrymple	do	1,400 00	Apr. 16, 1868	New Jersey	do	Volunteer Army three years.
James B. Deveaux	do	1,400 00	Aug. 17, 1877	Georgia	Colored	
Joseph B. Fowler	do	1,400 00	Nov. 17, 1867	Maryland	White	
George D. Frost	do	1,400 00	Apr. 17, 1869	New Hampshire	do	
Lee W. Funk	do	1,400 00	Mar. —, 1868	Ohio	do	
Benjamin F. Fuller	do	1,400 00	Jan. 7, 1870	New York	do	Volunteer Army three years.
John B. Gilfillen	do	1,400 00	Apr. —, 1869	Ohio	do	Do.
George W. Gist	do	1,400 00	July —, 1875	Kentucky	do	Volunteer Army one year.
William M. Gibson	do	1,400 00	Feb. 1, 1880?	Illinois	do	Volunteer Army one month; lost right arm.
John S. Hatch	do	1,400 00	May 31, 1865	Michigan	do	Volunteer Army three years and nine months.
James A. Harrison	do	1,400 00	July —, 1869	Ohio	do	Volunteer Army three years.
Chauncey G. Heath	do	1,400 00	July 2, 1869	Wisconsin	do	
Hugo Hillebrandt	do	1,400 00	July 29, 1875	North Carolina	do	Volunteer Army seven years and eleven months.
Seth A. Holton	do	1,400 00	July 2, 1867	Maryland	do	
Andrew J. Huntoon	do	1,400 00	Feb. —, 1869	New Hampshire	do	Volunteer Army two years.
J. H. Hitchcock	do	1,400 00	Apr. 2, 1879	New York	do	Volunteer Army eleven months.
Ruth G. D. Havens	do	1,400 00	Aug. 13, 1875	Connecticut	do	
Robert Stewart Jordan	do	1,400 00	Aug. 19, 1853	District of Columbia	do	

John H. Jackson	....do	1,400 00	Apr. 17, 1869	Ohio	....do	Navy one year and five months.
Solomon Johnson	....do	1,400 00	Feb. 12, 1867	....do	Colored	
Henry Jenkins	....do	1,400 00	Dec. 1, 1880	Iowa	White	Volunteer Army three years.
Walter M. Lawrence	....do	1,400 00	May 17, 1869	Pennsylvania	....do	Do.
Charles H. Lemos	....do	1,400 00	May 18, 1866	District of Columbia	Colored	
William Millar	....do	1,400 00	July 1, 1869	Pennsylvania	White	
S. H. Mirick	....do	1,400 00	Sept. 17, 1867	....do	....do	
Richard Oulahan	....do	1,400 00	Apr. 1, 1864	New York	....do	Volunteer Army one year.
Edwin D. B. Porter	....do	1,400 00	Feb, 21, 1876	Minnesota	....do	
Orlando H. Ross	....do	1,400 00	May 3, 1869	Ohio	....do	Volunteer Army three years.
Cassius M. Roudebush	....do	1,400 00	Apr. —, 1869	Kentucky	....do	
Alfred W. Rowell	....do	1,400 00	Mar. 15, 1862	District of Columbia	....do	
W. H. Stephens	....do	1,400 00	July 13, 1865	Ohio	....do	Volunteer Army one hundred days.
Henry C. Swan	....do	1,400 00	Aug. —, 1867	Pennsylvania	....do	
John C. Swift	....do	1,400 00	Feb. 5, 1866	Ohio	....do	
George W. Shockey	....do	1,400 00	Apr. 26, 1869	....do	....do	Volunteer Army four years.
William F. Sliney	....do	1,400 00	Feb. —, 1869	District of Columbia	....do	
Israel S. Smith	....do	1,400 00	June 17, 1861	Pennsylvania	....do	
James H. Stine	....do	1,400 00	Apr. —, 1869	Indiana	....do	Volunteer Army three years.
Myron A. Tappan	....do	1,400 00	Apr. 28, 1864	New York	....do	Volunteer Army two years and nine months.
Albert Walker	....do	1,400 00	June 7, 1865	Ohio	....do	Volunteer Army three years and nine months.
W. W. Wallace	....do	1,400 00	Mar. 17, 1868	Washington Ter	....do	
William Warren White	....do	1,400 00	Apr. 17, 1872	Kansas	....do	Volunteer Army three years.
Charles White	....do	1,400 00	June 9, 1865	District of Columbia	....do	Volunteer Army three years and three months.
Edward Webster	....do	1,400 00	Sept. 30, 1880	New Mexico	....do	Volunteer Army four years and seven months.
William H. Wikoff	....do	1,400 00	Mar. 2, 1867	New Jersey	....do	
Henry Billings	Clerk, first class	1,200 00	July 1, 1879	Indiana	....do	Volunteer Army three years.
Richard Burke	....do	1,200 00	July 1, 1879	West Virginia	....do	
Savita M. Brady	....do	1,200 00	Nov. 1, 1869	Illinois	....do	
Henry S. Boynton	....do	1,200 00	Sept. 12, 1865	Vermont	....do	
Thomas Brooks	....do	1,200 00	Apr. 21, 1881	Minnesota	....do	
J. Weed Corey	....do	1,200 00	Aug. 31, 1868	New York	....do	Volunteer Army two years.
Thomas C. Clark	....do	1,200 00	July 1, 1881	Nebraska	....do	Volunteer Army eight months, as chaplain.
S. O. Deaver	....do	1,200 00	Aug. 5, 1880	North Carolina	....do	[right arm.
Andrew Day	....do	1,200 00	Sept. 8, 1880	Iowa	....do	Volunteer Army one year and one months; lost
John Edwards	....do	1,200 00	May —, 1876	Arkansas	... do	Volunteer Army four years and six months.
A. R. French	....do	1,200 00	May 24, 1867	District of Columbia	....do	Regular Army thirteen years.
W. W. Granger	....do	1,200 00	July 13, 1881	Arkansas	....do	Volunteer Army three years.
W. H. Harmer	....ds	1,200 00	Mar. 1, 1880	Pennsylvania	....do	
George N. Hill	....do	1,200 00	Sept. 2, 1875	North Carolina	....do	Volunteer Army ten months.
Margarita R. Jackson	....do	1,200 00	July 1, 1878	New York	....do	
Charles L. Knapp	....do	1,200 00	Aug. 10, 1880	....do	....do	Volunteer Army one year and two months.
Thomas Kee	....do	1,200 00	Nov. —, 1869	Wisconsin	....do	Volunteer Army two years and eleven months.
Francis C. Long	....co	1,200 00	June 22, 1865	Connecticut	....do	Volunteer Army one year and two months.
Thomas A. Maguire	....do	1,200 00	July 1, 1880	Pennsylvania	....do	Volunteer Army ten months.
W. D. Moore	....do	1,200 00	Oct 20, 1880	Kansas	....do	
James M. Miller	....do	1,200 00	July 1, 1878	Ohio	....do	
William Newell	....do	1,200 00	Apr. 1, 1876	Oregon	....do	
Frank A. Nute	....do	1,200 00	July 7, 1880	Wisconsin	....do	
John O. O'Neill	....do	1,200 00	Oct. 10, 1870	Virginia	....do	Volunteer Army during the entire war.
John Pennywitt	....do	1,200 00	May 1, 1876	Ohio	....do	
William Pope	....do	1,200 00	Sept. 22, 1864	District of Columbia	....do	

OFFICE OF THE THIRD AUDITOR—Continued.

Name.	Grade.	Compensation.	Date of appointment.	State to which charged.	White or colored.	War record.
Henry F. Pierce	Clerk, first class	$1,200 00	July 3, 1880	Iowa	White	
Carl Roeser	do	1,200 00	Apr. —, 1861	Wisconsin	do	
Henry T. Rivers	do	1,200 00	Oct. 8, 1880	Texas	do	
William G. Russell	do	1,200 00	July 1, 1880	Pennsylvania	do	
Edgar T. Saunders	do	1,200 00	Nov. 1, 1877	Illinois	do	
Eliza McL. Seymour	do	1,200 00	Oct. 23, 1877	Ohio	do	
Hugh Tuohy	do	1,200 00	Aug. 7, 1863?	District of Columbia	do	
Harry Templar	do	1,200 00	May 2, 1881	Indiana	do	
John Walker	do	1,200 00	May 1, 1879	Pennsylvania	do	
William W. White	do	1,200 00	Mar. 8, 1876	Kentucky	do	Volunteer Army three years.
W. W. Wild	do	1,200 00	Apr. 22, 1878	California	do	Volunteer Army two years.
George B. Wright	do	1,200 00	Jan. 1, 1879	Ohio	do	Do.
George W. C. Waite	do	1,200 00	Feb. 24, 1872	Louisiana	do	
Burridge Wilson	do	1,200 00	July 3, 1878	Michigan	do	
A. B. Anderson	Clerk	1,000 00	July 1, 1880	Louisiana	do	
John F. Carnell	do	1,000 00	July 9, 1878	Iowa	do	Volunteer Army two years and six months.
Thomas P. Howard	do	1,000 00	Mar. 26, 1879	Pennsylvania	do	Volunteer Army one year and six months.
Julia W. Jones	do	1,000 00	July 9, 1877	Iowa	do	
George S. Newton	do	1,000 00	June 28, 1878	New Jersey	do	Volunteer Army three years and seven months.
William H. Whiting	do	1,000 00	Feb. 15, 1875	Wisconsin	do	Volunteer Army eight months.
R. S. Tharin	do	1,000 00	Sept. 13, 1881	South Carolina	do	Volunteer Army three months.
R. F. Barnes	Copyist	900 00	Nov. 5, 1877	New York	do	
William Cairns	do	900 00	Jan. 23, 1880	New Jersey	do	Volunteer Army one year and three months.
Mary A. Fields	do	900 00	July 1, 1881	Illinois	do	
Eugene Goldin	do	900 00	Sept. 1, 1881	Maryland	do	
L. L. Plummer	do	900 00	July —, 1877	Missouri	do	
Jane A. Stewart	do	900 00	Dec. —, 1875	Iowa	do	
Mrs. A. W. True	do	900 00	May —, 1869	New York	do	
Ginevra Williams	do	900 00	Aug. —, 1871	do	do	
Mrs. M. J. Wallace	do	900 00	May —, 1880	Pennsylvania	do	
Laura C. Yeager	do	900 00	Jan. —, 1869	do	do	
Jefferson Brooks	Laborer	660 00	Dec. 5, 1877	Louisiana	Colored	Volunteer Army thirteen months.
Leslie C. Boyd	do	660 00	May —, 1880	Tennessee	White	Volunteer Army one year.
Thomas C. Cox	do	660 00	Sept. 5, 1881	South Carolina	Colored	
Hugh H. Denny	do	660 00	Sept. 5, 1881	Illinois	do	Volunteer Army ten months.
Thaddeus J. Hamilton	do	660 00	Oct. 4, 1881	Florida	do	
Mrs. Annie J. Pritchard	do	660 00	Sept. 30, 1865	Pennsylvania	do	
Isaac Robinson	do	660 00	July 10, 1869	Maryland	do	
Wiley F. White	do	660 00	Jan. 29, 1872	North Carolina	do	
Mrs. Nancy White	do	480 00	July 1, 1875	District of Columbia	do	
Employés paid from lapse fund.						
Julia A. Breed	Copyist	900 00	July 1, 1881	California	White	

William R. Davis	....do	900 00	July 1, 1881	Nebraska	....do	
Mrs. L. M. Porter	....do	900 00	Sept. 12, 1881	Kentucky	....do	
Mrs. Emma L. Watkins	....do	900 00	July 8, 1881	Illinois	....do	
Mrs Sallie W. Willard	....do	900 00	July 1, 1880	Virginia	....do	
Charles D. Hudson	Assistant messenger	720 00	Mar. 18, 1881	Michigan	....do	Volunteer Army sixteen months.
Mrs. Carrie V. Millar	Laborer	660 00	June 1, 1881	Colorado	....do	
Mrs. Cynthia Slater	....do	660 00	July 1, 1880	Pennsylvania	....do	
Mrs. Susan A. Chapman	....do	480 00	July 14, 1881	Virginia	....do	

OFFICE OF FOURTH AUDITOR.

Paris H Tolson	Chief of division	$2, 000 00	Apr. 8, 1862	District of Columbia	White	
Robert Kearon	....do	2, 000 00	Apr. 1, 1862	....do	....do	
W. F. Stidham	....do	2, 000 00	Apr. 26, 1864	Pennsylvania	....do	Volunteer Army two years.
Lewis K. Brown	Clerk, fourth class	1, 800 00	Sept. 11, 1865	Maryland	....do	Volunteer Army two years and eight months.
Richard Goodhart	....do	1, 800 00	Dec. 4, 1865	Minnesota	....do	Volunteer Army three years.
Paul T. Bowen	Clerk, third class	1, 600 00	Apr. 17, 1872	Michigan	....do	
John Cook	....do	1, 600 00	July 8, 1865	Pennsylvania	....do	Volunteer Army one year.
J. H. De Meritt	....do	1, 600 00	Apr. 23, 1864	New Hampshire	....do	Navy seven months.
J. E. Darnall	....do	1, 600 00	Sept. 15, 1863	Indiana	....do	
Herman Forster	....do	1, 600 00	Jan. 1, 1866	District of Columbia	....do	Volunteer Army twenty-two months.
E. C. Fawcett	....do	1, 600 00	Nov. 1, 1872	Maryland	....do	
H. P. R. Holt	....do	1, 600 00	May 8, 1867	Connecticut	....do	
John J. Hayden	....do	1, 600 00	Dec. 23, 1878	Indiana	....do	
William Mertz	....do	1, 600 00	Aug. 26, 1863	District of Columbia	....do	
A. H. Marlow	....do	1, 600 00	April 1, 1865	....do	....do	
B. P. Mimmack	....do	1, 600 00	Nov. 2, 1872	New York	....do	Regular Army and Navy fourteen and a half years.
F. C. Severance	....do	1, 600 00	Nov. 8, 1872	Illinois	....do	Regular Army and Volunteers four years.
Edwin Salter	....do	1, 600 00	Mar. 27, 1867	New Jersey	....do	
Samuel White	....do	1, 600 00	Jan. 6, 1874	Maine	....do	
John T. Cramer	Clerk, second class	1, 400 00	Aug. 21, 1878	North Carolina	....do	Army four years.
David A. Coflin	....do	1, 400 00	Aug. 1, 1877	Arkansas	....do	Volunteer Army three years.
George P. Davis	....do	1, 400 00	July 20, 1878	Ohio	....do	Volunteer Army one year.
Aug. R. S. Foote	....do	1, 400 00	Jan. 22, 1880	Texas	....do	Volunteer Army and Navy two years.
B. E. Messer	....do	1, 400 00	Apr. 10, 1865	District of Columbia	....do	
James Morris	....do	1, 400 00	Jan. 1, 1880	Nebraska	....do	
N. D. Rittenour	....do	1, 400 00	Jan. 9, 1874	Virginia	....do	
Ogden Wyckoff	....do	1, 400 00	May 21, 1864	New York	....do	
T. C. Dickinson	Clerk, first class	1, 200 00	Feb. 3, 1878	Illinois	....do	Volunteer Army three years.
Kate L. Irland	....do	1, 200 00	June 13, 1879	Iowa	....do	
C. T. Limeburner	....do	1, 200 00	Feb. 24, 1866	Pennsylvania	....do	
George T. Parker	....do	1, 200 00	July 1, 1873	....do	....do	
Georgia F. Snow	....do	1, 200 00	Nov. 5, 1872	Michigan	....do	
Charles C. Smith	....do	1, 200 00	May —, 1868	Illinois	....do	Regular Army four years, war of Rebellion.
Nettie Sanford	....do	1, 200 00	Jan. 21, 1880	Iowa	....do	
C. C. Theaker	....do	1, 200 00	July 29, 1872	Maryland	....do	Volunteer Army two years.
W. H. Frazier	Clerk	1, 000 00	Sept. 22, 1864	District of Columbia	....do	Volunteer Army three months.
Thomas Jones	....do	1, 000 00	Sept. 4, 1869	... do	....do	

OFFICE OF FOURTH ATDITOR—Continued.

Name.	Grade.	Compensation.	Date of appointment.	State to which charged.	White or colored.	War record.
Elias M. Keils	Clerk	$1,000 00	May 23, 1879	Alabama	White	
Julia M. Adams	do	900 00	Apr. 13, 1864	Connecticut	do	
Eleanor A. Boynton	do	900 00	July 29, 1880	Ohio	do	
Mary Holtzman	do	900 00	Aug. 1, 1878	District of Columbia	do	
Miss K. V. Jennings	do	900 00	May 20, 1870	Virginia	Colored	
Mrs. A. E. Trewitt	do	900 00	Apr. 1, 1865	District of Columbia	White	
Nicholas Warner	Assistant messenger	720 00	Apr. 1, 1868	do	Colored	
Thomas Cox	Laborer	660 00	Apr. 1, 1868	do	do	
Charles H. McCord	do	660 00	Dec. 20, 1877	Ohio	White	
Temporarily employed and paid from lapse fund.						
Eliza C. Scidmore	Clerk	900 00	July 20, 1870	Wisconsin	White	
Mrs. L. Von Peuchelstine	Laborer	660 00	Apr. 1, 1878	New Jersey	do	

OFFICE OF THE FIFTH AUDITOR.

George Cowie	Chief of division	$2,000 00	Mar. 9, 1861	Iowa	White	
R. B. Detrick	do	2,000 00	July 1, 1864	District of Columbia	do	
Endicott King	Fourth class clerk	1,800 00	Mar. 30, 1863	do	do	
Charles F. Schmidt	do	1,800 00	Apr. 7, 1862	do	do	
E. C. Clarke	Third class clerk	1,600 00	May 5, 1869	Wisconsin	do	
A. O. Latham	do	1,600 00	Mar. 13, 1866	District of Columbia	do	
Hiram Pitts	do	1,600 00	June 7, 1864	Illinois	do	
V. N. Stiles	do	1,600 00	Mar. 16, 1867	Massachusetts	do	
Henry Warrington	do	1,600 00	Mar. 6, 1860	District of Columbia	do	
Charles H. Butler	Second class clerk	1,400 00	Jan. 11, 1879	Indiana	do	
George Cook	do	1,400 00	Sept. 1, 1875	Massachusetts	do	
J. K. Sullivan	do	1,400 00	Apr. 1, 1871	New Hampshire	do	Volunteer Army three years.
William Woodburn	do	1,400 00	Apr. 28, 1865	Ohio	do	
Michael Frank	First class clerk	1,200 00	May 11, 1870	Wisconsin	do	
S. H. Galpin	do	1,200 00	Feb. 19, 1864	Connecticut	do	
Miss Delia E. Quin	do	1,200 00	Jan. 5, 1871	Michigan	do	
James Rea	do	1,200 00	May 1, 1878	Illinois	do	
James E. Shepherd	do	1,200 00	Apr. 23, 1881	Indiana	do	
Mrs. Louise Tompkins	do	1,200 00	Aug. —, 1874	Missouri	do	
Miss Hattie Jennings	Clerk	1,000 00	July 13, 1877	Wisconsin	do	
Miss Jennie M. Waller	do	1,000 00	Nov. 27, 1869	New York	do	
Mrs. M. E. Cutter	do	900 00	July 1, 1873	Maine	do	
Mrs. M. J. Lowry	do	900 00	July 21, 1871	District of Columbia	do	
Mrs. F. M. Rohrer	do	900 00	July 14, 1868	do	do	

J. H. De Lamotta'	Messenger	840 00	Oct. 16, 1880	Georgia	Colored	
Charles Mathews	Laborer	660 00	Feb. 7, 1871	District of Columbia	....do	
Temporary employés paid from lapse fund.						
Miss Anna B. Heath	Clerk	900 00	Apr. 13, 1881	North Carolina	White	
Mrs. Sarah F. Seaton	....do	900 00	Mar. 26, 1875	New York	....do	

OFFICE OF THE AUDITOR OF THE TREASURY FOR THE POST-OFFICE DEPARTMENT.

Boone Chambers	Chief clerk	$2,000 00	Nov. 6, 1869	District of Columbia	White	
E. J. Evans	Chief of division	2,000 00	July 1, 1861	Virginia	....do	
William H. Gunnison	....do	2,000 00	Sept. 20, 1861	Maryland	....do	
Benjamin Lippincott	....do	2,000 00	June 12, 1861	Pennsylvania	....do	
John Lynch	....do	2,000 00	Aug. 22, 1861	Indiana	....do	
John B. Sleman	....do	2,000 00	Sept. 24, 1870	Illinois	....do	Volunteer Army two years.
James T. Smith	Chief of division	2,000 00	May 13, 1869	....do	....do	Volunteer Army four years.
R. S. Widdicombe	....do	2,000 00	Feb. 23, 1864	Maryland	....do	Volunteer Army two years.
Joseph B. Will	....do	2,000 00	May 14, 1861	Ohio	....do	
Zabina Ellis	Disbursing clerk	2,000 00	June 21, 1864	New York	....do	Volunteer Army fifteen months.
D. N. Burbank	Fourth class clerk	1,800 00	July 17, 1869	....do	....do	Volunteer Army two and one-half years.
E. A. Clifford	....do	1,800 00	July 1, 1878	Illinois	....do	
John B. Dunning	....do	1,800 00	Feb. 1, 1881	Connecticut	....do	Volunteer Army two years and five months.
De W. Haines	....do	1,800 00	Oct. 17, 1863	Pennsylvania	....do	
C. M. B. Harris	....do	1,800 00	Nov. 2, 1872	Maryland	....do	
M. L. Higgins	....do	1,800 00	July 15, 1861	Michigan	....do	
J. W. Nicholls	....do	1,800 00	Oct. 29, 1863	Delaware	....do	
A. H. Nixon	....do	1,800 00	Feb. 10, 1865	Illinois	....do	Volunteer Army three years and three months.
James F. Patterson	....do	1,800 00	Nov. 1, 1872	New York	....do	
Truman S. Post	....do	1,800 00	June 1, 1869	Texas	....do	Volunteer Army four and one-half years.
F. I. Seybolt	....do	1,800 00	May 16, 1861	New York	....do	
H. E. Weaver	....do	1,800 00	June 1, 1869	Pennsylvania	....do	Regular Army four and one-half years.
William H. Alden	Third class clerk	1,600 00	Mar. 9, 1870	Illinois	....do	Volunteer Army three years.
F. W. Archibald	....do	1,600 00	Mar. 1, 1873	Kansas	....do	Volunteer Army two and one-half years.
James B. Austin	....do	1,600 00	Oct. 18, 1869	Maryland	....do	Volunteer Army three years.
Hiram D. Bodine	....do	1,600 00	Oct. 1, 1879	Ohio	....do	Do.
James W. Brady	....do	1,600 00	May 12, 1873	Maryland	....do	Volunteer Army one year.
W. D. Burbage	....do	1,600 00	Sept. 6, 1869	District of Columbia	....do	Volunteer Army three years.
David L. Burnett	....do	1,600 00	May 1, 1874	Iowa	....do	
W. W. Burnett	....do	1,600 00	Oct. 1, 1869	District of Columbia	....do	
D. A. Burrows	....do	1,600 00	Dec. 13, 1867	Connecticut	....do	Volunteer Army three years.
William Child	....do	1,600 00	Aug. 1, 1861	Pennsylvania	....do	
Arthur Clements	....do	1,600 00	July 14, 1869	Maryland	....do	Volunteer Army three months; Volunteer Navy six years.
Edwin Coombs	....do	1,600 00	July 1, 1869	Massachusetts	....do	
George H. Cooper	....do	1,600 00	Apr. 1, 1872	Wisconsin	....do	Volunteer Army three years.
J. W. Cromwell	....do	1,600 00	Nov. 2, 1872	Virginia	Colored	

OFFICE OF THE AUDITOR OF THE TREASURY FOR THE POST-OFFICE DEPARTMENT—Continued.

Name.	Grade.	Compensation.	Date of appointment.	State to which charged.	White or colored.	War record.
Henry Cushing	Third class clerk	$1,600 00	Apr. 26, 1869	Illinois	White	Volunteer Army three years; Regular Army three years and six months.
George A. Darling	do	1,600 00	June 16, 1877	South Carolina	do	Volunteer Army three and one-half years.
John H. Dixon	do	1,600 00	Oct. 1, 1864	District of Columbia	do	Volunteer Army three months.
H. A. Dobson	do	1,600 00	Nov. 1, 1874	New York	do	Volunteer Army one year.
William C. Eckles	do	1,600 00	Nov. 1, 1879	Pennsylvania	do	Volunteer Army four years.
J. K. P. Gleeson	do	1,600 00	Mar. 1, 1876	do	do	Volunteer Army six weeks.
Arthur Griffith	do	1,600 00	Apr. 13, 1868	New York	do	
Z. P. Gunion	do	1,600 00	Aug. 7, 1861	Indiana	do	
Charles Hendley	do	1,600 00	May 7, 1862	Kentucky	do	
Milton M. Holland	do	1,600 00	May 25, 1869	District of Columbia	Colored	Volunteer Army two and one-half years.
L. F. Hunt	do	1,600 00	Nov. 13, 1871	Ohio	White	
W. W. Johnston	do	1,600 00	Feb. 26, 1874	Virginia	do	Volunteer Army one year.
W. J. Ketcham	do	1,600 00	Dec. 10, 1863	District of Columbia	do	
Leicester King	do	1,600 00	Apr. 1, 1878	Ohio	do	Volunteer Army twenty-two months.
W. M. King	do	1,600 00	Feb. 9, 1865	New York	do	
John L. Lake	do	1,600 00	May 7, 1862	do	do	
D. W. Lathrop	do	1,600 00	Feb. 24, 1865	Maine	do	
William B. Laub	do	1,600 00	Oct. 30, 1863	District of Columbia	do	
John S. Manning	do	1,600 00	Apr. 30, 1869	Ohio	do	Volunteer Army three years.
A. F. Marsh	do	1,600 00	July 17, 1863	New York	do	
Arthur E. Miley	do	1,600 00	Aug. 7, 1865	Ohio	White	Volunteer Army three and one-half years.
O. W. Minor	do	1,600 00	June 1, 1866	do	do	Do.
J. S. Maffatt	do	1,600 00	June 16, 1864	New York	do	
B. F. Moore	do	1,600 00	Dec. 1, 1865	Ohio	do	Volunteer Army three and one-half years.
Samuel B. Morse	do	1,600 00	Feb. 2, 1863	Wisconsin	do	Volunteer Army one year.
M. C. Munson	do	1,600 00	May 8, 1861	Virginia	do	
Andrew M. McBath	do	1,600 00	Feb. 15, 1876	Tennessee	do	Volunteer Army ten months.
E. W. Newman	do	1,600 00	July 1, 1874	Maryland	do	Volunteer Army one year.
William B. Noerr	do	1,600 00	July 10, 1865	District of Columbia	do	Volunteer Army three months.
Benjamin F. Peters	do	1,600 00	Oct. 11, 1876	Maryland	do	Volunteer Army two and one-half years.
David L. Pitcher	do	1,600 00	Feb. 15, 1876	New York	do	Volunteer Army three years.
R. N. Saunders	do	1,600 00	July 1, 1874	District of Columbia	do	
James S. Sharp	do	1,600 00	Jan. 23, 1869	West Virginia	do	
Albert L. Smith	do	1,600 00	Aug. 1, 1872	New York	do	Volunteer Army three years.
L. T. Squire	do	1,600 00	Mar. 21, 1871	Michigan	do	Do.
F. I. Tedford	do	1,600 00	June 16, 1877	Iowa	do	Volunteer Army four years.
Jos. Trainor	do	1,600 00	July 1, 1874	Maryland	do	Volunteer Army three years.
Adolph Van Reuth	do	1,600 00	Jan. 1, 1873	do	do	
William Waring	do	1,600 00	Apr. 1, 1872	Ohio	Colored	Chaplain Regular Army twenty months.
Dana White	do	1,600 00	May 29, 1877	Minnesota	White	Volunteer Army two years.
Henry W. Wheeler	do	1,600 00	Aug. 12, 1867	Maine	do	Volunteer Army five and one-half years.
Henry C. Wire	do	1,600 00	Nov. 16, 1874	Ohio	do	Volunteer Army three years.
Thomas E. Woods	do	1,600 00	Jan. 6, 1879	Illinois	do	Volunteer Army two and one-half years.

C. D. Appleton	Second class clerk	1,400 00	Sept. 27, 1861	Massachusetts	White	
Henry A. Bales	....do	1,400 00	Aug. 24, 1868	Indiana	....do	Volunteer Army three years.
Richard H. Ball	....do	1,400 00	July 11, 1864	District of Columbia	....do	
Edward Bangs	....do	1,400 00	Feb. 1, 1876	Maryland	....do	
S. M. Barrows	....do	1,400 00	July 1, 1875	Maine	....do	Volunteer Army three years.
John Basil	....do	1,400 00	July 1, 1875	Maryland	....do	
Josiah Bellows	....do	1,400 00	July 13, 1865	New Hampshire	....do	Volunteer Army three months.
J. McE. Bishop	....do	1,400 00	Feb. 1, 1878	Tennessee	....do	
S. I. Bradley	....do	1,400 00	July 1, 1880	Connecticut	....do	
Charles S. Burke	....do	1,400 00	Dec. 28, 1874	Ohio	....do	
Payson Burritt	....do	1,400 00	Dec. 8, 1877	Texas	....do	Volunteer Army three months.
F. L. Cardoza	....do	1,400 00	July 1, 1878	South Carolina	Colored	
Mrs. L. B. Chandler	....do	1,400 00	Aug. 5, 1870	Massachusetts	White	
John M. Coburn	....do	1,400 00	Nov. 27, 1878	Indiana	....do	
John Cover	....do	1,400 00	June 23, 1879	Wisconsin	....do	Volunteer Army three years.
Robert C. Crooks	....do	1,400 00	June 12, 1869	West Virginia	....do	Volunteer Army four years.
Phillip A. Crist	....do	1,400 00	Aug. 21, 1878	Illinois	....do	
W. H. Crowell	....do	1,400 00	Jan. 13, 1881	Ohio	....do	
P. J. Downing	....do	1,400 00	Mar. 10, 1869	New Jersey	....do	Volunteer Army three and one-half years.
Sam. R. English	....do	1,400 00	July 1, 1872	Pennsylvania	....do	
J. C. Farquhar	....do	1,400 00	July 1, 1874	Maryland	....do	
George M. Fisher	....do	1,400 00	June 1, 1877	Georgia	....do	
Moses S. Gibson	....do	1,400 00	Jan. 4, 1878	Wisconsin	....do	Volunteer Army four months.
G. G. Griswold	....do	1,400 00	June 1, 1869	New York	....do	Volunteer Army two years.
R. V. Harrison	....do	1,400 00	Oct. 3, 1869	Maryland	....do	
Frederick Harvey	....do	1,400 00	Feb. 3, 1869	Massachusetts	....do	Regular and Volunteer Army six years.
Mrs. E. J. C. Hibbs	....do	1,400 00	Aug. 1, 1873	District of Columbia	....do	
B. W. Holman	....do	1,400 00	June 10, 1873	Wisconsin	....do	
Edgar Janney	....do	1,400 00	Feb. 5, 1874	Virginia	....do	
A. W. Johnston	....do	1,400 00	May 15, 1876	Ohio	....do	
William E. Jones	....do	1,400 00	Mar. 1, 1877	....do	....do	
J. B. Kellogg	....do	1,400 00	Apr. 8, 1870	Connecticut	.... do	Volunteer Army three years.
T. L. Lamb	....do	1,400 00	Dec. 31, 1866	Illinois	....do	Volunteer Army six days.
E. L. Lambie	....do	1,400 00	Mar. 1, 1870	District of Columbia	....do	Volunteer Army eleven months.
G. H. Lillebridge	....do	1,400 00	Aug. 17, 1880	Connecticut	.... do	Volunteer Army three years.
John W. Lugenbeel	....do	1,400 00	Jan. 1, 1875	District of Columbia	....do	
Miss I. MacAdam	....do	1,400 00	July 1, 1875	Pennsylvania	....do	
J. H. Magee	....do	1,400 00	July 8, 1880	....do	.... do	
Charles D. Merwin	....do	1,400 00	Jan. 1, 1879	Louisiana	.... do	Volunteer Army three months.
John P. Millard	....do	1,400 00	Sept. 22, 1871	Pennsylvania	....do	Prisoner of war Q. M. D. fourteen months; Volunteer Army three months.
Kossuth M. Murphy	....do	1,400 00	Apr. 1, 1878	California	....do	
T. C. Murray	....do	1,400 00	July 1, 1869	Pennsylvania	....do	
G. F. Needham	....do	1,400 00	July 7, 1863	Maryland	....do	
Henry W. Olds	....do	1,400 00	Nov. 1, 1878	Minnesota	....do	
John O'Neill	....do	1,400 00	Feb. 1, 1865	Pennsylvania	.... do	
J. W. Penn	....do	1,400 00	Jan. 12, 1870	Maryland	.... do	Volunteer Army nine months.
Edwin Perkins	....do	1,400 00	Apr. 17, 1869	Ohio	....do	Volunteer Army three years.
J. P. Perley	....do	1,400 00	Oct. 1, 1869	Michigan	....do	Volunteer Army three years and eight months.
G. H. Richardson	....do	1,400 00	Jan. 1, 1875	Ohio	Colored	
James E. Sebring	....do	1,400 00	Jan. 29, 1871	Minnesota	White	
D. R. Smiley	....do	1,400 00	June 1, 1864	New Hampshire	....do	

OFFICE OF THE AUDITOR OF THE TREASURY FOR THE POST-OFFICE DEPARTMENT—Continued.

Name.	Grade.	Compensation.	Date of appointment.	State to which charged.	White or colored.	War record.
Abel S. Smith	Second class clerk	$1,400 00	Oct. 21, 1870	Ohio	White	
Miss M. J. Snowden	do	1,400 00	May 16, 1872	New Jersey	do	
Andrew H. Stamp	do	1,400 00	July 1, 1875	New York	do	Volunteer Army nineteen months.
Stephen A. Swailes	do	1,400 00	Dec. 4, 1878	South Carolina	Colored	Volunteer Army two and one-half years.
T. H. Sypherd	do	1,400 00	Aug. 3, 1870	Virginia	White	Volunteer Army three months.
R. S. Todd	do	1,400 00	June 5, 1876	Kentucky	do	
George H. Tucker	do	1,400 00	June 1, 1869	New York	do	Regular Navy two years.
Miss Eliza C. Tullock	do	1,400 00	Nov. 1, 1869	Massachusetts	do	
M. A. Turner	do	1,400 00	Aug. 15, 1849	Pennsylvania	do	
H. K. Van Buskirk	do	1,400 00	June 1, 1869	New York	do	
Alfred Wallace	do	1,400 00	Mar. 1, 1865	Massachusetts	do	
W. A. Wayne	do	1,400 00	July 17, 1875	Alabama	do	
J. C. Weaver	do	1,400 00	Nov. 1, 1871	Ohio	do	Volunteer Army four months.
E. J. Whipple	do	1,400 00	Mar. 2, 1881	Colorado	do	
J. E. Wilkins	do	1,400 00	Feb. 18, 1871	Illinois	do	
J. W. Wisner	do	1,400 00	Apr. 1, 1880	do	do	Volunteer Army three years.
John M. Wright	do	1,400 00	July 1, 1878	Indiana	do	Volunteer Army two years.
Jason Yurann	do	1,400 00	July 9, 1877	Kansas	do	
Bertrand S. Ashby	First class clerk	1,200 00	July 6, 1877	Texas	do	
George W. Balsley	do	1,200 00	July 12, 1877	Illinois	do	Volunteer Army one year.
Robert G. Brown	do	1,200 00	May 2, 1879	do	do	
Albert G. Burbridge	do	1,200 00	Oct. 16, 1877	Kentucky	do	
Zachariah T. Burton	do	1,200 00	Sept. 1, 1880	Indiana	do	
J. A. S. Carpenter	do	1,200 00	June 1, 1869	Missouri	do	
Andrew H. W. Clum	do	1,200 00	Dec. 1, 1877	Wisconsin	do	
F. D. Connelly	do	1,200 00	May 2, 1864	Pennsylvania	do	
Henry C. Craft	do	1,200 00	July 1, 1880	Indiana	do	
James Dean	do	1,200 00	July 1, 1881	Florida	Colored	
C. E. Dibble	do	1,200 00	Sept. 7, 1880	Georgia	White	Regular Army one and one-half years; Volunteer Army four and one-half years.
W. H. Doherty	do	1,200 00	July 1, 1878	North Carolina	do	Volunteer Army two years.
Ed. S. Duvall	do	1,200 00	July 10, 1880	California	do	
Jos. S. Farden	do	1,200 00	July 1, 1880	Alabama	do	
John C. Ferguson	do	1,200 00	Jan. 1, 1875	District of Columbia	do	
William B. Dodge	do	1,200 00	Oct. 1, 1881	Virginia	do	Volunteer Army three years.
Theodore H. Greene	do	1,200 00	July 5, 1881	Mississippi	Colored	
C. Hardaway	do	1,200 00	June 29, 1880	Missouri	White	Volunteer Army three years.
J. M. Hawkesworth	do	1,200 00	Feb. 7, 1876	Mississippi	Colored	
J. C. Hawley	do	1,200 00	July 1, 1877	Michigan	White	Volunteer Army three and one-half years.
Miss M. N. Hooper	do	1,200 00	Mar. 13, 1872	Massachusetts	do	
William H. Horn	do	1,200 00	June 1, 1880	Pennsylvania	do	Volunteer Army one year and three months.
Miss A. E. Howell	do	1,200 00	July 1, 1876	Iowa	do	
Miss Florence T. Johnston	do	1,200 00	May 1, 1878	Alabama	do	
Mayned Jones	do	1,200 00	Aug. 3, 1880	Michigan	do	

John H. Kingsbury	do	1,200 00	July 17, 1880	Pennsylvania	do	Volunteer Army four months.
John A. Lynch	do	1,200 00	Nov. 11, 1878	Ohio	do	Volunteer Army four years and three months.
M. H. McWhorter	do	1,200 00	June 1, 1877	Georgia	do	
James H. Moody	do	1,200 00	Apr. 20, 1865	New Hampshire	do	
Harrison W. Moore	do	1,200 00	July 1, 1881	North Carolina	do	Volunteer Army one year and two months.
Miss Emma F. Morrell	do	1,200 00	July 15, 1875	Maine	do	
Joseph H. Oram	do	1,200 00	July 14, 1880	Pennsylvania	do	
M. D. Overacker	do	1,200 00	June 1, 1881	Florida	do	Volunteer Army three years.
Miss I. L. Paige	do	1,200 00	June 1, 1877	Texas	do	
Roddie Reynolds	do	1,200 00	July 1, 1880	Ohio	do	Regular Navy one and one-half years.
Edwin W. Roach	do	1,200 00	Dec. 13, 1878	Texas	do	
Pinkney Rollins	do	1,200 00	June 1, 1880	North Carolina	do	
Nath. J. Rowell	do	1,200 00	Nov. 1, 1879	Illinois	do	
Miss Carrie S. Sheads	do	1,200 00	July 1, 1865	Pennsylvania	do	
William Shelly	do	1,200 00	June 1, 1863	New York	do	Volunteer Army six years.
William Shunk	do	1,200 00	July 10, 1880	Ohio	do	Volunteer Army two and one-half years.
Mrs. Abbie J. Smith	do	1,200 00	Nov. 16, 1871	New York	do	
George C. Smith	do	1,200 00	July 1, 1877	Mississippi	Colored	Volunteer Army two months.
Eli L. Stillson	do	1,200 00	Feb. 1, 1876	Michigan	White	Volunteer Army three years.
Mrs. M. S. Thompson	do	1,200 00	Mar. 3, 1876	Indiana	do	
Arthur W. Upshaw	do	1,200 00	July 1, 1880	Georgia	Colored	
William W. Wilder	do	1,200 00	July 1, 1877	Michigan	White	Volunteer Army two years.
Green D. Williams	do	1,200 00	July 5, 1881	South Carolina	Colored	
Thomas M. Wilkes	do	1,200 00	July 9, 1880	do	do	
Lewis B. Wynne	do	1,200 00	Dec. 12, 1866	Illinois	do	
Morris M. Ogden	do	1,200 00	May 26, 1876	New York	White	
Wyatt Archer	Clerk	1,000 00	Mar. 1, 1870	Virginia	Colored	
Miss C. P. Bateman	do	1,000 00	Dec. 1, 1878	Michigan	White	
James E. Beller	do	1,000 00	July 1, 1875	New York	do	
Andrew J. Benton	do	1,000 00	Sept. 1, 1881	Iowa	do	
F. T. Bleakmore	do	1,000 00	July 1, 1881	do	do	
Riley J. Bliss	do	1,000 00	Aug. 1, 1881	Kansas	do	
Mrs. Alme D. Brooks	do	1,000 00	Feb. 15, 1876	Alabama	do	
John W. Chandler	do	1,000 00	Mar. 21, 1876	Minnesota	do	
Miss M. A. Clark	do	1,000 00	Feb. 1, 1880	Ohio	do	
Henry H. Clark	do	1,000 00	July 1, 1878	Michigan	do	
John W. Conner	do	1,000 00	Dec. 13, 1879	Tennessee	do	
Miss M. L. Doane	do	1,000 00	Mar. 16, 1876	Michigan	do	
George E. Harris	do	1,000 00	Mar. 1, 1877	Alabama	do	
Henry M. Higbee	do	1,000 00	Dec. 13, 1873	Wisconsin	do	
Frank T. Hyman	do	1,000 00	June 16, 1877	North Carolina	Colored	
Leo Karpeles	do	1,000 00	Nov. 4, 1875	Massachusetts	White	Volunteer Army three years.
John H. Lane	do	1,000 00	July 1, 1880	North Carolina	Colored	
B. Y. Martin	do	1,000 00	Apr. 15, 1874	Alabama	do	
Granville Mason	do	1,000 00	Dec. 18, 1873	District of Columbia	do	
George W. Renfro	do	1,000 00	Sept. 29, 1863	Kentucky	do	
W. H. Romaine	do	1,000 00	Nov. 21, 1872	District of Columbia	White	Whole period of rebellion; eight years United States Marines; Regular Artillery five years.
Mrs. S. C. Stilley	do	1,000 00	June 17, 1877	North Carolina	do	
Leonard Stoddard	do	1,000 00	Sept. 1, 1871	Massachusetts	do	
Henry C. Tisdel	do	1,000 00	Apr. 1, 1880	Ohio	do	
Thomas H. Vance	do	1,000 00	July 1, 1877	Florida	Colored	

OFFICE OF THE AUDITOR OF THE TREASURY FOR THE POST-OFFICE DEPARTMENT—Continued.

Name.	Grade.	Compensation.	Date of appointment.	State to which charged.	White or colored.	War record.
George Walters	First class clerk	$1,000 00	Dec. 6, 1879	Illinois	White	Volunteer Army three years.
Richard White	do	1,000 00	Dec. —, 1836	District of Columbia	do	
George Williams	do	1,000 00	Mar. 1, 1876	Arkansas	do	Volunteer Army eleven months; Volunteer Navy seven months.
Mrs. Eliza Winter	do	1,000 00	Apr. 1, 1876	Kentucky	do	
Mrs. C. A. Montgomery	do	1,000 00	July 1, 1880	Iowa	do	
Willard D. Doremus	Skilled laborer	1,000 00	Sept. 1, 1880	New York	do	
Mrs. Catharine Burke	Assorter of money orders	900 00	July 1, 1878	Missouri	do	
Mrs. Margaret Fallon	do	900 00	Dec. 13, 1873	New York	do	
Miss Della Hinds	do	900 00	Dec. 1, 1875	District of Columbia	do	
Mrs. Orvilla M. Luff	do	900 00	Mar. 9, 1881	Nevada	do	
Mrs. M. C. Moreau	do	900 00	Aug. 2, 1875	Indiana	do	
Miss M. C. O'Brien	do	900 00	May 8, 1877	California	do	
Mrs. Emma J. Palmer	do	900 00	July 1, 1880	Connecticut	do	
Mrs. Agnes M. Pepper	do	900 00	May 9, 1881	Delaware	do	
Mrs. Anna Platt	do	900 00	Oct. 16, 1880	Indiana	do	
Mrs. S. C. Robinson	do	900 00	May 12, 1873	Massachusetts	do	
Mrs. V. E. Robinson	do	900 00	Aug. 1, 1881	Florida	do	
Mrs. Addie F. Rynex	do	900 00	July 2, 1881	Illinois	do	
Miss Mary A. Skinner	do	900 00	July 1, 1880	Wisconsin	do	
Mrs. Electa E. Smith	do	900 00	Feb. 2, 1880	Illinois	do	
Miss S. Alice Somerville	do	900 00	July 2, 1880	Alabama	Colored	
Mrs. A. M. Swaine	do	900 00	Feb. 24, 1870	Massachusetts	White	
Miss I. F. Williams	do	900 00	Oct. 2, 1877	do	do	
Mrs. Hallie H. Yates	do	900 00	July 5, 1877	South Carolina	do	
Annie E. Dalton *	do	900 00	July 1, 1880	Pennsylvania	do	
Murray Donaldson	Assistant messenger	720 00	July 1, 1873	District of Columbia	do	
Kinsey Dyer	Laborer	660 00	June 13, 1861	do	do	
James E. Edwards	do	660 00	Dec. 1, 1874	South Carolina	Colored	
Herman B. Heiken	do	660 00	May 17, 1881	Illinois	White	
George M. Hickman	do	660 00	May 19, 1864	District of Columbia	Colored	
Charles Johnson	do	660 00	July 1, 1869	do	do	
John L. Lacey	do	660 00	Apr. 22, 1869	do	do	
William Landers	do	660 00	May 12, 1881	Mississippi	do	Volunteer Army.
Thomas Langhorn	do	660 00	Apr. 24, 1873	New York	White	Volunteer Army three years.
John Meaney	do	660 00	Oct. 1, 1872	District of Columbia	do	Volunteer Army three months.
J. W. McFarland	do	660 00	Aug. 5, 1880	Mississippi	Colored	
Thomas B. O'Connor	do	660 00	Mar. 1, 1879	Alabama	White	Regular Army two years.
David Sheppard	do	660 00	Feb. 1, 1875	Virginia	Colored	
John E. Smith	do	660 00	Dec. 18, 1879	do	do	
John T. Tinney	do	660 00	June 17, 1869	District of Columbia	do	
N. M. Waggener	do	660 00	Sept. 1, 1875	West Virginia	White	
Richard White	do	660 00	Nov. 1, 1874	District of Columbia	Colored	
James P. Whitty	do	660 00	July 1, 1879	New York	White	
James H. Moore	do	660 00	Aug. 26, 1873	Michigan	do	

H. Berry	Charwoman	180 00	July 1, 1880	District of Columbia	Colored	
Grace Crippen	do	180 00	July 1, 1878	do	White	
Ella Chapin	do	180 00	Mar. 1, 1880	do	do	
Ellen Fleming	do	180 00	Nov. 1, 1881	do	do	
Hannah Grant	do	180 00	July 1, 1878	do	Colored	
Mary Jones	do	180 00	July 1, 1881	do	do	
Anna Patterson	do	180 00	July 1, 1878	do	do	
M. A. Plant	do	180 00	Sept. 1, 1880	do	White	
Sarah Prender	do	180 00	July 3, 1879	do	do	
Virginia H. Riordan	do	180 00	Dec. 1, 1879	do	do	

OFFICE OF THE TREASURER OF THE UNITED STATES.

James W. Whelpley	Cashier	$3,600 00	Aug. 29, 1861	New York	White	
Edward O. Graves	Superintendent National Bank Redemption Agency.	3,500 00	June 1, 1863	do	do	
Haorce A. Whitney	Assistant cashier	3,200 00	Aug. 12, 1867	do	do	Volunteer Army five years.
Charles Lyman	Chief clerk	2,500 00	Dec. 17, 1864	Connecticut	do	Volunteer Army one year.
Jerome C. Burnett	Chief of division	2,500 00	Jan. 1, 1876	Indiana	do	
Charles L. Jones	do	2,500 00	July 1, 1864	New York	do	Volunteer Army two years.
Charles H. Davidge	do	2,500 00	July 1, 1875	Indiana	do	
Delavan W. Harrington	do	2,500 00	Sept. 20, 1866	New York	do	Volunteer Army three years.
William Wirt Wilson	do	2,500 00	Sept. 7, 1861	Massachusetts	do	Volunteer Army four months.
James F. Meline	Principal bookkeeper	2,500 00	Sept. 24, 1864	Ohio	do	Volunteer Army four and one-half years.
Thomas E. Rogers	do	2,500 00	July 23, 1874	West Virginia	do	
Fred. W. Moffatt	Teller	2,500 00	Mar. 1, 1864	District of Columbia	do	
Edward R. True	do	2,500 00	Mar. 1, 1864	Maine	do	
Edwin W. Wilson	do	2,500 00	Feb. 21, 1870	Maryland	do	
Francis A. Simons	Assistant bookkeeper	2,400 00	Aug. 20, 1862	New York	do	
Ferdinand Weiler	do	2,400 00	Oct. 4, 1866	do	do	Volunteer Army four years.
William Howard Gibson	Assistant teller	2,250 00	Oct. 8, 1864	Pennsylvania	do	Volunteer Army three years.
Alfred R. Quaiffe	do	2,250 00	Aug. 28, 1765	New York	do	Do.
Henry M. Ewing	do	2,000 00	June —, 1866	Iowa	do	
George A. Bassett	Clerk, fourth-class	1,800 00	Dec. 17, 1878	New York	do	Volunteer Army sixty days.
Charles H. Buxton	do	1,800 00	June 11, 1864	Virginia	do	Volunteer Army three years.
Parley H. Eaton	do	1,800 00	Aug. 25, 1865	New York	do	Volunteer Army four years.
Robert H. Forsyth	do	1,800 00	Mar. 7, 1870	do	do	
Myron B. W. Hough	do	1,800 00	Feb. 14, 1872	do	do	
Anderson D. Johnston	do	1,800 00	Mar. 10, 1870	Kentucky	do	
James M. King	do	1,800 00	July 1, 1875	Indiana	do	Volunteer Army three years.
Frank W. Lantz	do	1,800 00	Sept. 1, 1875	do	do	
Robert S. Lytle	do	1,800 00	Oct. 15, 1874	Alabama	do	Volunteer Navy two years.
Jos. O. Manson	do	1,800 00	Nov. 11, 1874	Tennessee	do	Volunteer Army four years.
Lewis Mann	do	1,800 00	Aug. 19, 1861	Pennsylvania	do	
William B. McKelden	do	1,800 00	Aug. 24, 1867	District of Columbia	do	Volunteer Army three months.
Edwin M. McLeod	do	1,800 00	Sept. 24, 1864	New York	do	
Thomas M. McNeely	do	1,800 00	July 2, 1877	Pennsylvania	do	Volunteer Army four years.
John R. Morhous	do	1,800 00	July 15, 1864	New York	do	

* Temporarily employed and paid from lapse fund.

OFFICE OF THE TREASURER OF THE UNITED STATES—Continued.

Name.	Grade.	Compensation.	Date of appointment.	State to which charged.	White or colored.	War record.
Maurice L. Muhleman	Clerk, fourth-class	$1,800 00	Aug. 1, 1872	Missouri	White	
Sherman Platt	do	1,800 00	Aug. 17, 1865	Wisconsin	do	Volunteer Army three years.
Thomas Petingale	do	1,800 00	Mar. 10, 1863	New York	do	
William H. Plunkett	do	1,800 00	Oct. 15, 1869	Wisconsin	do	Volunteer Army during war.
James C. Boynton	do	1,800 00	Sept. 24, 1864	Pennsylvania	do	Volunteer Army three years.
James E. Reynolds	do	1,800 00	Apr. 29, 1872	New York	do	
David A. Ritter	do	1,800 00	Feb. 9, 1875	Georgia	do	
Nathaniel J. Rockwood	do	1,800 00	Dec. 10, 1864	Massachusetts	do	
Andrew L. Rutter	do	1,800 00	Oct. 4, 1866	Ohio	do	Volunteer Army three months.
James A. Sample	do	1,800 00	May —, 1869	Indiana	do	
Edward Stephens	do	1,800 00	Mar. 16, 1876	New York	do	Volunteer Army three years.
William H. Sterne	do	1,800 00	Jan. 2, 1874	Indiana	do	Volunteer Army.
William F. Williams	do	1,800 00	Aug. 5, 1867	District of Columbia	do	
John S. Anderson	Clerk, third-class	1,600 00	Sept. 20, 1866	do	do	
Gideon C. Bantz	do	1,600 00	May 13, 1873	Maryland	do	
George C. Chipman	do	1,600 00	Jan. 6, 1863	New York	do	
Elbert O. Corwin	do	1,600 00	Dec. 1, 1875	do	do	
William Crane	do	1,600 00	May 1, 1873	Missouri	do	
George N. French	do	1,600 00	July 7, 1865	New Hampshire	do	Volunteer Army three years.
John W. Harsha	Clerk, third-class	1,600 00	Apr. 16, 1868	Pennsylvania	do	Volunteer Army three years.
Jos. R. Hertford	do	1,600 00	July 1, 1864	Illinois	do	
William Cyril Keech	do	1,600 00	May 1, 1873	New York	do	Volunteer Army one year.
John Kingdon	do	1,600 00	June 10, 1871	Missouri	do	
David H. Lamb	do	1,600 00	June 7, 1873	Pennsylvania	do	Volunteer Army three years.
William W. Penfield	do	1,600 00	Apr. 8, 1875	New York	do	
Everett B. Sanders	do	1,600 00	Apr. 1, 1878	Wisconsin	do	
Carl Stierlin	do	1,600 00	Sept. 24, 1864	Missouri	do	Volunteer Army three years.
Charles Thwing	do	1,600 00	July 1, 1875	New York	do	
A. D. Van Derveer	do	1,600 00	July 1, 1875	New Jersey	do	Volunteer Army one year.
William T. Van Doren	do	1,600 00	Oct. 23, 1863	Indiana	do	Volunteer Army, chaplain.
Allen K. Wagner	do	1,600 00	Jan. 18, 1875	West Virginia	do	
Albert Wallace	do	1,600 00	June 8, 1864	New Hampshire	do	
Abram Zoller	do	1,600 00	July 10, 1865	District of Columbia	do	
William S. Ball	Clerk, second-class	1,400 00	Sept. 8, 1874	Virginia	do	
John T. Barnes	do	1,400 00	Aug. 10, 1861	Maryland	do	
Miss Margaret E. Barr	do	1,400 00	July 6, 1874	District of Columbia	do	
James H. Bonebrake	do	1,400 00	Feb. 1, 1876	Indiana	do	Volunteer Army.
Patrick Byrne	do	1,400 00	Oct. 5, 1863	District of Columbia	do	
Thomas H. Byrnes	do	1,400 00	July 1, 1864	do	do	
William H. Colesberry	do	1,400 00	July 1, 1875	Illinois	do	
R. Walter Collins	do	1,400 00	July 1, 1875	District of Columbia	do	
Dennis Coughlin	do	1,400 00	June 4, 1869	New York	do	Volunteer Army three years.
Charles Dunlap	do	1,400 00	Mar. 6, 1876	do	do	
Daniel W. Herriott	do	1,400 00	Aug. 10, 1875	Indiana	do	

William H. King	do	1,400 00	Apr. 25, 1866	Rhode Island	do	Volunteer Army.
Albert W. Paine	do	1,400 00	May 8, 1873	Wisconsin	do	Do.
Nathan E. Rice	do	1,400 00	Oct. 10, 1877	California	do	
Mrs. Lydia E. Rosenberg	do	1,400 00	July 16, 1863	District of Columbia	do	
Willard F. Warner	do	1,400 00	July 1, 1879	Georgia	do	
Samuel Wallace	do	1,400 00	Oct. 4, 1866	New York	do	
John S. Woodworth	do	1,400 00	May —, 1863	Ohio	do	Volunteer Army.
Jonathan Wright	do	1,400 00	July 13, 1867	District of Columbia	do	Volunteer Army five years.
Charles Atkinson	Clerk, first-class	1,200 00	Oct. 20, 1871	Ohio	do	
Jos. W. Babe	do	1,200 00	Sept. 20, 1866	Arkansas	do	Volunteer Army.
Wallace G. Bone	do	1,200 00	Aug. 1, 1874	Illinois	do	Do.
William H. Blodgett	do	1,200 00	Nov. 5, 1874	New York	do	
Miss Kate M. Brady	do	1,200 00	Oct. 30, 1869	Pennsylvania	do	
Louis Burgdorf	do	1,200 00	Apr. 25, 1866	District of Columbia	do	
George N. Burns	do	1,200 00	Jan. 24, 1870	Connecticut	do	Volunteer Army three years.
Miss Mary A. Clark	do	1,200 00	May 8, 1874	Vermont	do	
Amos Crounse	do	1,200 00	Nov. 17, 1868	Virginia	do	Volunteer Army three years.
Miss Frances A. Daly	do	1,200 00	Nov. 4, 1869	District of Columbia	do	
Miss Annie E. Demarest	do	1,200 00	Oct. 30, 1869	New York	do	
Michael A. Donnelly	do	1,200 00	Feb. 19, 1866	Pennsylvania	do	
James Gillin	do	1,200 00	May 3, 1879	New Jersey	do	Volunteer Army four years.
Miss Laura V. Harbaugh	do	1,200 00	July 27, 1874	District of Columbia	do	
Miss Lucie B. Hudson	do	1,200 00	July 1, 1875	Virginia	do	
Miss Flora S. Hutchinson	do	1,200 00	July 1, 1875	Kansas	do	
Thomas J. Hulbert	do	1,200 00	Mar. 1, 1864	Michigan	do	
Miss H. C. Keller	do	1,200 00	Apr. 4, 1862	District of Columbia	do	
Miss Ella M. Marsh	do	1,200 00	July 1, 1875	do	do	
Jas. G. McCouch	do	1,200 00	Oct. 14, 1874	Pennsylvania	do	
William E. Middleton	do	1,200 00	Jan. 20, 1877	Iowa	do	
Miss Ella A. Morrill	do	1,200 00	Feb. 12, 1870	Maine	do	
Rufus P. Murray	do	1,200 00	Feb. 26, 1879	Missouri	do	Volunteer Army one and one-half years.
Miss Helen E. Noyes	do	1,200 00	July 1, 1875	District of Columbia	do	
Thomas E. Nyman	do	1,200 00	July 1, 1875	Maryland	do	Volunteer Army three months.
Miss Mary A. Poler	do	1,200 00	July 1, 1875	District of Columbia	do	
Walter S. Pratt	do	1,200 00	Apr. 1, 1867	do	do	
Daniel Robertson	do	1,200 00	Oct. 3, 1863	do	do	
Miss Evelyn C. Schell	do	1,200 00	July 1, 1875	Kansas	do	
Miss Eva N. Scott	do	1,200 00	July 1, 1875	New York	do	
Jos. S. Snowden	do	1,200 00	Sept. 5, 1867	Pennsylvania	do	
William E. Spencer	do	1,200 00	May 5, 1879	Wisconsin	do	
Arthur P. Steward	do	1,200 00	Nov. 28, 1874	New Jersey	do	
Miss Elizabeth Stoner	do	1,200 00	Oct. 9, 1862	Pennsylvania	do	
Miss Belle S. Tracy	do	1,200 00	Oct. 9, 1862	District of Columbia	do	
Daniel Taggart	do	1,200 00	Sept. 4, 1869	New Jersey	do	
Wilmer P. Vale	do	1,200 00	Aug. 9, 1875	District of Columbia	do	
Mrs. Jennie M. Vincent	do	1,200 00	July 22, 1874	Tennessee	do	
Nathan Webster	do	1,200 00	July 15, 1874	Maine	do	
Miss Kate M. Wheat	do	1,200 00	Feb. 1, 1869	Ohio	do	
Miss Julia E. Ashley	Clerk	1,000 00	Dec. 1, 1871	Massachusetts	do	
Miss Mary C. Abbott	do	1,000 00	Feb. 1, 1875	Ohio	do	
Miss Cassie M. Collins	do	1,000 00	July 1, 1875	Pennsylvania	do	
Miss Caro E. Kershaw	do	1,000 00	Oct. 14, 1874	Illinois	do	

OFFICE OF THE TREASURER OF THE UNITED STATES—Continued.

Name.	Grade.	Compensation.	Date of appointment.	State to which charged.	White or colored.	War record.
Miss Cary A. Leavy	Clerk	$1,000 00	Dec. 17, 1869	Kentucky	White	
Mrs. Willa A. Leonard	do	1,000 00	July 1, 1864	Pennsylvania	do	
Thomas J. Phillips	do	1,000 00	Nov. 17, 1866	District of Columbia	do	Volunteer Army.
Miss Ella J. Plimpton	do	1,000 00	Mar. 8, 1865	Massachusetts	do	
Miss Charl'te M. Raynsford	do	1,000 00	July 1, 1875	New York	do	
Miss Minnie W. Russell	do	1,000 00	Dec. 14, 1874	District of Columbia	do	
Albert W. Tyler	do	1,000 00	Apr. 6, 1869	Massachusetts	do	Volunteer Army three years.
J. Henry Weber	do	1,000 00	Dec. 26, 1871	District of Columbia	do	Do.
Miss Frances A. Wheelock	do	1,000 00	Oct. 2, 1875	New York	do	
Charles H. White	do	1,000 00	Apr. 3, 1872	Pennsylvania	do	Volunteer Army.
Frank Wolfe	do	1,000 00	July 1, 1875	New York	do	Navy two years.
Mrs. M. Fannie Adams	do	900 00	July 2, 1879	Texas	do	
Mrs. Martha A. Ashburn	do	900 00	Jan. 24, 1870	District of Columbia	do	
Jesse M. Bassett	do	900 00	Dec. 18, 1867	do	do	
Mrs. Ernestine Becker	do	900 00	Aug. 16, 1865	Illinois	do	
Mrs. Elizabeth R. Blague	do	900 00	Dec. 17, 1869	Connecticut	do	
Mrs. Julia B. Bomar	do	900 00	Dec. 1, 1878	South Carolina	do	
Mrs. Rebecca McP. Bonsal	do	900 00	July 6, 1868	Kansas	do	
Miss Mary H. Brigham	do	900 00	May 4, 1876	Ohio	do	
Mrs. Amanda E. Brown	do	900 00	Mar. 18, 1875	New York	do	
Miss Lillie A. Burns	do	900 00	July 1, 1874	District of Columbia	do	
Miss Letitia Calhoun	do	900 00	Dec. 3, 1873	do	do	
Miss Annie M. Carter	do	900 00	July 1, 1873	Alabama	do	
Miss A. S. A. Clingan	do	900 00	Jan. 24, 1870	Maryland	do	
Miss Annie M. Cocks	do	900 00	Feb. 12, 1870	Illinois	do	
Mrs. Charlotte E. Cross	do	900 00	May 11, 1866	New York	do	
Mrs. Mary E. Crosthwaite	do	900 00	Apr. 1, 1880	Michigan	do	
Mrs. Mary J. Davidson	do	900 00	Jan. 4, 1872	New York	do	
Mrs. Lucy A. Davis	do	900 00	Jan. 20, 1870	Missouri	do	
Miss Lily M. Dent	do	900 00	July 20, 1877	District of Columbia	do	
Mrs. Kate P. Dexter	do	900 00	July 2, 1879	Minnesota	do	
Mrs. Nellie Devendorf	do	900 00	Aug. 1, 1878	New York	do	
Mrs. Addie Divine	do	900 00	Sept. 23, 1874	Pennsylvania	do	
Miss Jennie Dulany	do	900 00	Feb. 12, 1870	Virginia	do	
Miss Susan Dugger	do	900 00	Apr. 13, 1864	Illinois	do	
Miss Ina N. Duvall	do	900 00	Feb. 12, 1870	District of Columbia	do	
Miss Emma E. Edson	do	900 00	Mar. 18, 1876	Minnesota	do	
Miss Lucy E. Everett	do	900 00	Nov. 4, 1869	Maryland	do	
Miss Katie D. Frye	do	900 00	May 15, 1879	Alabama	do	
Harry St. C. Gangewer	do	900 00	Aug. 25, 1871	District of Columbia	do	
Mrs. Mary A. Gibson	do	900 00	May 31, 1865	Pennsylvania	do	
Mrs. Lizzie A. Grant	do	900 00	Feb. 16, 1876	Wisconsin	do	
Miss Emma R. Graves	do	900 00	Apr. 23, 1864	New York	do	
Mrs. Abbie H. Green	do	900 00	July 28, 1864	District of Columbia	do	

Mrs. Sallie F. Harper	do	900	00	Oct. —, 1875	Indiana	do
Miss Kate M. Hayden	do	900	00	Oct. 13, 1874	do	do
Miss Anna Heald	do	900	00	Dec. 16, 1871	Illinois	do
Miss Minnie B. Heard	do	900	00	July 1, 1881	Missouri	do
Mrs. Effie Herron	do	900	00	Feb. 9, 1874	Maryland	do
Miss Frances S. Hoey	do	900	00	Apr. 13, 1864	Ohio	do
Miss Louis B. Hunter	do	900	00	Sept. 11, 1880	Michigan	do
Miss Emma P. Johnston	do	900	00	July 11, 1877	Mississippi	do
Mrs. S. R. Keeler	do	900	00	Jan. 3, 1878	Kansas	do
Mrs. Alice Kern	do	900	00	July 16, 1874	District of Columbia	do
Miss Bettie Kirkwood	do	900	00	June 5, 1875	Iowa	do
Miss Mellen P. Knight	do	900	00	Dec. 17, 1869	New York	do
Mrs. Jemima C. Lambert	do	900	00	Feb. 1, 1876	Indiana	do
Miss Mary L. Larner	do	900	00	Sept. 24, 1874	Texas	do
Mrs. Achsah A. Loomis	do	900	00	Apr. 16, 1879	West Virginia	do
Mrs. Cynthia M. Ludlow	do	900	00	Feb. 1, 1876	New Jersey	do
Mrs. Sarah Magruder	do	900	00	Jan. 24, 1870	District of Columbia	do
Mrs. Julia R. Marvin	do	900	00	July 1, 1875	New York	do
Miss Annie E. Matthews	do	900	00	July 3, 1878	Virginia	do
Mrs. Julia B. Maynadier	do	900	00	July 1, 1877	Louisiana	do
Mrs. Emma C. McCutchins	do	900	00	Aug. 22, 1866	New York	do
Mrs. Mary E. Meem	do	900	00	Jan. 8, 1872	District of Columbia	do
Miss Mary A. Naylor	do	900	00	Apr. 4, 1868	Pennsylvania	do
C. C. J. Norris	do	900	00	July 19, 1877	Illinois	do
Mrs. Maggie S. Norvell	do	900	00	July 3, 1877	Michigan	do
Miss Julia O'Laughlin	do	900	00	Oct. 16, 1874	Maryland	do
Mrs. Ellen O'Rorke	do	900	00	Aug. 6, 1869	New York	do
Mrs. Maggie A. Ourand	do	900	00	Jan. 4, 1872	District of Columbia	do
Mrs. Eliz. B. Patterson	do	900	00	Nov. 22, 1869	Pennsylvania	do
Miss Inez I. Paul	do	900	00	Dec. 4, 1878	Wisconsin	do
Miss Helen K. Pearl	do	900	00	Feb. 1, 1866	District of Columbia	do
Miss Emma V. Pendleton	do	900	00	Aug. 18, 1880	Virginia	do
Mrs. Mary F. Per Lee	do	900	00	Dec. 1, 1877	Ohio	do
Mrs. Susan L. Reeve	do	900	00	Jan. 4, 1872	Michigan	do
Miss Lena Relay	do	900	00	June 7, 1866	Pennsylvania	do
Miss Mary P. Renshawe	do	900	00	Mar. 7, 1877	Illinois	do
Mrs. Eliz. A. Ringgold	do	900	00	Mar. 27, 1865	New York	do
Miss Agnes M. Rodgers	do	900	00	Sept. 16, 1878	Illinois	do
Miss Ann E. Roff	do	900	00	May 1, 1876	Michigan	do
Mrs. Helen M. Rolle	do	900	00	Jan. 10, 1872	District of Columbia	do
Miss Mary I. Senter	do	900	00	Sept. 18, 1874	do	do
Miss Laura B. Shaw	do	900	00	Apr. 5, 1877	Illinois	do
Mrs. Amelia M. Simons	do	900	00	June 14, 1865	New York	do
Miss Alma C. Smith	do	900	00	Jan. 13, 1868	Maine	do
Mrs. Mary S. Smith	do	900	00	July 26, 1866	Virginia	do
Miss Gussie Spengeman	do	900	00	July 2, 1881	Arkansas	do
Mrs. Mary E. Storer	do	900	00	Apr. 18, 1866	New York	do
Mrs. Julia A. Thompson	do	900	00	July 1, 1874	Vermont	do
Miss Mary A. Thorpe	do	900	00	July 9, 1875	Wisconsin	do
Mrs. Clarissa M. Venable	do	900	00	Jnly 13, 1867	District of Columbia	do
Miss Jessie F. Waite	do	900	00	July 10, 1880	Illinois	do
Miss Mary M. Ward	do	900	00	Jan. 24, 1870	District of Columbia	do

OFFICE OF THE TREASURER OF THE UNITED STATES—Continued.

Name.	Grade.	Compensation.	Date of appointment.	State to which charged.	White or colored.	War record.
Miss Sadie E. Wilkinson	Clerk	$900 00	Sept. 1, 1881	Nevada	White	
Mrs. Lucy L. Williams	do	900 00	Sept. 30, 1880	Indiana	do	
David C. Yingling	do	900 00	Mar. 10, 1870	Pennsylvania	do	Volunteer Army three months.
Mrs. Mary E. Zeller	do	900 00	Dec. 7, 1874	Texas	do	
Edward Bright	Messenger	840 00	Oct. 22, 1874	Virginia	Colored	Volunteer Army.
Benjamin S. Ferguson	do	840 00	Dec. 14, 1874	District of Columbia	White	Volunteer Army and Navy.
James D. Rowe	do	840 00	July 18, 1868	do	Colored	Volunteer Army.
George Ruland	do	840 00	Oct. 19, 1874	do	White	Do.
Daniel Shea	do	840 00	Apr. 14, 1869	Connecticut	do	Do.
Jesse B. Sloat	do	840 00	Aug. 16, 1873	Virginia	do	Do.
James Devlin	Assistant messenger	720 00	Dec. 14, 1875	Pennsylvania	do	
James D. Dudley	do	720 00	Aug. 25, 1875	North Carolina	Colored	Volunteer Army three years.
J. Don Farden	do	720 00	May 6, 1878	Alabama	White	
Miss Sallie M. Johnson	do	720 00	Dec. 1, 1878	Iowa	do	
John F. G. Lyons	do	720 00	Sept. 14, 1875	District of Columbia	do	Army twenty-eight years.
Samuel A. McKinney	do	720 00	Mar. 1, 1877	Mississippi	Colored	
George Scharf	do	720 00	Jan. 9, 1880	Pennsylvania	White	
Benjamin F. Trenis	do	720 00	Nov. 3, 1870	Maryland	do	
John Vigal	do	720 00	Nov. 16, 1874	District of Columiba	Colored	
Edwin N. Atherton	Laborer	660 00	July 1, 1879	Missouri	White	Volunteer Army.
Miss Ann Ballentine	do	660 00	Apr. 15, 1873	Maryland	do	
John R. Brown	do	660 00	Mar. 23, 1872	District of Columbia	Colored	
Miss H. Irene Christine	do	660 00	Sept. 1, 1875	do	White	
Miss Kate Dacey	do	660 00	Oct. 20, 1874	do	do	
Mrs. Kate Dodson	do	660 00	Sept. 1, 1880	do	Colored	
Miss Annie H. Doherty	do	660 00	Dec. 28, 1871	do	White	
Mrs. Mary A. Fitzsimmons	do	660 00	Dec. 1, 1878	New York	do	
John J. Harley	do	660 00	May 6, 1878	Kansas	do	
Mrs. Louisa Hill	do	660 00	July 1, 1878	North Carolina	Colored	
Mrs. Sophie Holmes	do	660 00	Oct. 18, 1862	District of Columbia	do	
John A. Kirk	do	660 00	Sept. 1, 1879	Tennessee	White	
Mrs. Gertrude Knowles	do	660 00	Feb. 21, 1870	District of Columbia	do	
Benjamin Lanum	do	660 00	June 1, 1857	Maryland	Colored	
Mrs. Florence Lithgow	do	660 00	Nov. 16, 1871	District of Columbia	White	
John B. Lynch	do	660 00	July 7, 1879	Indiana	do	Volunteer Army sixteen years.
Mrs. Hannah Monroe	do	660 00	Oct. 16, 1879	Maine	do	
John Oliver	do	660 00	Nov. 16, 1880	Tennessee	do	Volunteer Army three years.
Mrs. Elizabeth Purcell	do	660 00	Aug. 12, 1874	District of Columbia	do	
Miss Minnie C. Scriver	do	660 00	Dec. 1, 1878	Minnesota	do	
Mrs. Catherine Tennant	do	660 00	Apr. 2, 1873	District of Columbia	do	
Mrs. Charlotte R. Thomas	do	660 00	Apr. 1, 1880	Iowa	do	
Miss Lizsetta Wagner	do	660 00	Aug. 24, 1874	District of Columbia	do	
Mrs. Mary Warren	do	660 00	Jan. 22, 1870	do	do	
Mrs. Johana Wieling	do	660 00	Dec. 6, 1869	do	do	

Mrs. Frances Avery	do	240 00	June 8, 1871	do	Colored	
Mrs. Jane Bradley	do	240 00	Aug. 15, 1874	do	White	
Mrs. Catherine Burke	do	240 00	July 19, 1875	do	do	
Mrs. Mary Cashman	do	240 00	Jan. 10, 1876	do	do	
Mrs. Helen N. Chelf	do	240 00	May 25, 1877	do	Colored	
Mrs. Ellen F. Fish	do	240 00	July 22, 1879	do	White	
Mrs. Mary Jane King	do	240 00	Oct. 1, 1880	do	Colored	
Temporarily employed and paid from lapse-fund.						
Edmund L. Beach	Clerk	1,600 00	Aug. 23, 1871	Connecticut	White	
Bruce Cavill	do	900 00	July 1, 1881	Tennessee	do	
Miss Anna B. Stealey	do	900 00	Jan. 24, 1881	West Virginia	do	
Mrs. Addie F. Rynex	do	900 00	July 2, 1881	Illinois	do	
Miss Fannie F. Wilkins	do	900 00	Feb. 1, 1881	New York	do	
Mrs. Louise Del Monte	Laborer	660 00	May 1, 1881	do	do	
Mrs. M. E. McPherson	do	660 00	May 1, 1881	Iowa	do	
Miss Lizzie M. Burnett	do	660 00	Sept. 17, 1881	Oregon	do	
Mrs. Mary Waldo	do	660 00	Sept. 18, 1881	Illinois	do	

OFFICE OF THE REGISTER OF THE TREASURY.

John Hamilton Beatty	Chief of division	$2,000 00	June 27, 1864	Iowa	White	
Hartwell Jenison	do	2,000 00	July 29, 1863	New York	do	
Lewis D. Moore	do	2,000 00	June 13, 1864	Maine	do	
Charles Neale	do	2,000 00	Dec. 21, 1861	Pennsylvania	do	
Newell B. Walker	do	2,000 00	Sept. 2, 1870	New York	do	
Edwin S. Collamer	Disbursing clerk	2,000 00	June 13, 1861	Vermont	do	
William Blasland	Clerk, fourth class	1,800 00	Oct. 17, 1864	Massachusetts	do	Volunteer Army three years and one month.
Newton Ferree	do	1,800 00	Dec. 20, 1867	Ohio	do	Volunteer Army eight months and eight days.
Christopher C. Graham	do	1,800 00	July 6, 1864	Iowa	do	
Howard M. Gillman	do	1,800 00	Sept. 1, 1864	Maryland	do	Volunteer Army three years.
William Guilford	do	1,800 00	Oct. 1, 1863	do	do	Volunteer Army one year.
Leapold A. F. Harard	do	1,800 00	Nov. 11, 1872	District of Columbia	do	Vol. and Reg. Army four years and three mo's.
Arthur Hendricks	do	1,800 00	July 24, 1865	New York	do	Volunteer Army two years and eleven months.
Thomas G. Hensey	do	1,800 00	May 4, 1869	do	do	Volunteer Army four years and four months.
Paul Hersh	do	1,800 00	June 3, 1871	Pennsylvania	do	Volunteer Army two years and ten months.
Wallace H. Hills	do	1,800 00	May 9, 1865	New York	do	
Edward S. Jones	do	1,800 00	June 21, 1865	Pennsylvania	do	
William Lamborn	do	1,800 00	Aug. 15, 1865	do	do	Volunteer Army two y'rs, ten mo's, fifteen d'ys.
Charles H. Merwin	do	1,800 00	Oct. 7, 1863	Ohio	do	
Samuel J. Millard	do	1,800 00	Aug. 15, 1864	Kansas	do	
Frederick S. Nichols	do	1,800 00	Sept. 7, 1864	Massachusetts	do	
Henry C. Pearson	do	1,800 00	June 2, 1865	Pennsylvania	do	Volunteer Army one y'r, nine mo's, seven d'ys.
Allen Wall	do	1,800 00	June 19, 1871	do	do	Vol. Army two y'rs, ten mo's, twenty-one d'ys.
Nathan Burnham	Clerk, third class	1,600 00	Oct. 18, 1864	Maryland	do	Volunteer Army one year and eight months.
Martin V. Casey	do	1,600 00	May 6, 1869	Pennsylvania	do	Vol. and Reg. Army three years and nine mo's.
John L. Doty	do	1,600 00	Mar. 6, 1871	do	do	
Albert C. Floyd	do	1,600 00	July 29, 1871	Massachusetts	do	
Jabez Fox	do	1,600 00	June 23, 1863	Michigan	do	

OFFICE OF THE REGISTER OF THE TREASURY—Continued.

Name.	Grade.	Compensation.	Date of appointment.	State to which charged.	White or colored.	War record.
Washington F. Gapen	Clerk, third class	$1,600 00	Oct. 16, 1875	Illinois	White	
Paul Havenstein	do	1,600 00	May 22, 1867	New Jersey	do	
John Johnson	do	1,600 00	July 1, 1869	Wisconsin	do	Volunteer Army two years and ten days.
John F. Kelly	do	1,600 00	July 6, 1875	Illinois	do	Volunteer Army four years and four months.
Charles N. Lapham	do	1,600 00	July 29, 1869	Vermont	do	Volunteer Army three years.
Samuel C. Lovejoy	do	1,600 00	June 16, 1873	Maine	do	Vol. Army three years, one month, eleven d'ys.
Robert A. McMurray	do	1,600 00	Feb. 6, 1864	Pennsylvania	do	Volunteer Army three months.
Charles T. Nutze	do	1,600 00	Mar. 28, 1864	do	do	Volunteer Army two years, six mo's, one day.
William H. Proctor	do	1,600 00	Mar. 7, 1870	District of Columbia	do	Vol. Army three y'rs, one mo., and four days.
Charles K. W. Strong	do	1,600 00	Nov. 1, 1862	Vermont	do	
Charles P. Wannall	do	1,600 00	June 25, 1855	District of Columbia	do	
William A. Waugh	do	1,600 00	Aug. 12, 1858	do	do	Volunteer Army three months.
George W. Allen	Clerk, second class	1,400 00	Jan. 5, 1870	Massachusetts	do	Vol. Army two y rs, nine mo's, and eleven days.
George T. Bradford	do	1,400 00	Apr. 1, 1875	District of Columbia	do	
Rodolph S. Cowing	do	1,400 00	Feb. 6, 1879	Indiana	do	
William F. DeKnight	do	1,400 00	Jan. 29, 1874	South Carolina	do	Vol. Army six years, three mo's, and six days.
Stephen E. Gough	do	1,400 00	May 20, 1865	New Jersey	do	
Mellen C. Hooker	do	1,400 00	May 1, 1874	Vermont	do	
William H. Howell	do	1,400 00	July 11, 1879	New Jersey	do	
Frank E. Little	do	1,400 00	Feb. 18, 1879	Florida	do	Volunteer Army four years and four months.
Mrs. Lizzie P. McIntire	do	1,400 00	Dec. 1, 1878	Indiana	do	
George C. Rice	do	1,400 00	Feb. 22, 1863	Illinois	do	
Benjamin F. Rittenhouse	do	1,400 00	May —, 1819	District of Columbia	do	
Isaac W. Slokom	do	1,400 00	Mar. 23, 1880	Pennsylvania	do	
Nathaniel T. Taylor	do	1,400 00	Feb. 14, 1879	Michigan	do	
Israel E. Vail	do	1,400 00	Sept. 2, 1875	Kansas	do	Volunteer Army.
Joseph S. Van Arsdale	do	1,400 00	May 1, 1866	New Jersey	do	
Robert B. Bagby	Clerk, first class	1,200 00	July 5, 1881	Indiana	Colored	V. Army one y'r, eleven mo's, twenty-two days.
William D. Bard	do	1,200 00	May 29, 1880	Georgia	White	
Edmund B. Belding	do	1,200 00	Jan. 9, 1877	Ohio	do	Vol. Army three y'rs, eleven mo's, and four days.
Alonzo B. Chatfield	do	1,200 00	Mar. 27, 1880	Illinois	do	Vol. Army two years, one month, and six days.
Mrs. Emily S. M. Chisolm	do	1,200 00	Jan. 1, 1878	Mississippi	do	
Miss Annie E. Fithian	do	1,200 00	Feb. 13, 1866	Pennsylvania	do	
Lucius E. Gridley	do	1,200 00	July 1, 1879	Michigan	do	Volunteer Army two years.
William M. Lytle	do	1,200 00	Jan. 24, 1881	Ohio	do	
Sherman M. Merrill	do	1,200 00	Dec. 13, 1880	Georgia	do	Volunteer Army two years.
Willard T. Moore	do	1,200 00	Apr. —, 1879	Michigan	do	
Miss Fidelia J. Richards	do	1,200 00	Jan. 15, 1876	Illinois	do	
Thomas H. Ridgate	do	1,200 00	Apr. 10, 1878	Louisiana	do	Volunteer Navy two years and six months.
Miss Mary R. Roach	do	1,200 00	Apr. 22, 1863	District of Columbia	do	
Miss Juliet G. Shearer	do	1,200 00	Sept. 17, 1863	Pennsylvania	do	
John H. Simpson	do	1,200 00	July 7, 1865	Massachusetts	do	Vol. Army two y'rs, four mo's, and nine days.
Charles R. Smith	do	1,200 00	Feb. 5, 1879	Louisiana	do	
Charles D. Welch	do	1,200 00	May 3, 1869	District of Columbia	do	

Samuel B. Wilson	do	1,200 00	May 1, 1869	Pennsylvania	do		
Miss Frances E. Bidwell	Clerk	1,000 00	May 4, 1868	California	do		
Miss Mary K. Lowry	do	1,000 00	July 24, 1878	Iowa	do		
Miss Mary E. Pancoast	do	1,000 00	July 6, 1869	New Jersey	do		
John A. Travis	do	1,000 00	Apr. 1, 1880	New York	do		Vol. Army two y'rs., seven mo's, and one day.
Mrs. Deborah J. Apple	Copyist and counter	900 00	Mch. 16, 1875	Illinois	do		
Mrs. Ann Blake	do	900 00	Aug. 30, 1865	District of Columbia	do		
Miss Mary L. Barton	do	900 00	Feb. 14, 1862	do	do		
Mrs. Margaret Bernard	do	900 00	Aug. 3, 1866	do	do		
Miss Mary H. Brady	do	900 00	Apr. 22, 1875	Illinois	do		
Miss Grace I. Boss	do	900 00	Apr. 6, 1880	Rhode Island	do		
Miss Phebe A. Carter	do	900 00	Apr. 3, 1865	District of Columbia	do		
Mrs. Mary H. Converse	do	900 00	Aug. 21, 1865	Illinois	do		
Mrs. Lydia G. Conkling	do	900 00	Apr. 16, 1866	Pennsylvania	do		
Mrs. Emily F. Conway	do	900 00	Feb. 14, 1871	Kansas	do		
Mrs. Maggie Crawford	do	900 00	Aug. 1, 1868	Pennsylvania	do		
Miss Henrietta V. Cooper	do	900 00	Dec. 4, 1879	Kentucky	do		
Miss Eugenie Cooper	do	900 00	Jan. 9, 1880	Illinois	do		
Miss Harriet R. Duchman	do	900 00	Dec. 1, 1869	Pennsylvania	do		
Mrs. Sarah J. Dempster	do	900 00	Apr. 20, 1874	Ohio	do		
Miss Anna S. Douglass	do	900 00	Sept. 5, 1879	New York	do		
Miss Kate McC. Elliotte	do	900 00	Mar. 12, 1865	Tennessee	do		
Miss Mary Erickson	do	900 00	Apr. 1, 1879	do	do		
Mrs. Hariet M. Ford	do	900 00	June 15, 1868	Ohio	do		
Warren G. Fearing	do	900 00	July 14, 1875	North Carolina	Colored		
Mrs. Mary Galway	do	900 00	Feb. 1, 1869	Pennsylvania	White		
Miss Elida J. Gifford	do	900 00	Feb. 1, 1876	Ohio	do		
Miss Catharine Gossler	do	900 00	Feb. 24, 1870	Delaware	do		
Miss Minnie Harrison	do	900 00	Mar. 1, 1879	Pennsylvania	do		
Mrs. Dorcas V. Hicks	do	900 00	May 11, 1868	Ohio	do		
Mrs. Anna Hill	do	900 00	Jan. 11, 1878	Georgia	do		
Mrs. Marcia V. Hopkins	do	900 00	Aug. 27, 1867	District of Columbia	do		
Mrs. Catharine Hoffman	do	900 00	Oct. 1, 1868	Minnesota	do		
James F. Huguley	do	900 00	Mar. 11, 1871	Massachusetts	do		
Mrs. Mary H. Johnston	do	900 00	Feb. 1, 1876	Ohio	do		
Jefferson H. Johnston	do	900 00	Jan. 1, 1874	do	do		Volunteer Army two months and ten days.
Mrs. Margaret A. Johnston	do	900 00	Oct. 16, 1880	Kansas	do		
Miss Kate Kavanaugh	do	900 00	July 1, 1873	Wisconsin	do		
Miss Mary I. Kinsey	do	900 00	Feb. 1, 1876	Ohio	do		
Miss Tonina Korhammer	do	900 00	Nov. 2, 1874	District of Columbia	do		
Mrs. George Anne Lee	do	900 00	Nov. 9, 1870	do	do		
Mrs. MaryF. McCaffrey	do	900 00	Apr. 23, 1863	Ohio	do		
Mrs. Mary A. McCulloch	do	900 00	June 11, 1864	New York	do		
Mrs. Emma McGowan	do	900 00	July 5, 1865	Pennsylvania	do		
Mrs. Kate McKenna	do	900 00	Nov. 4, 1874	New York	do		
Mrs. Rebecca E. Michoner	do	900 00	Mar. 12, 1871	Pennsylvania	do		
Mrs. Anna M. Mozart	do	900 00	May 1, 1876	Michigan	do		
Miss Virginia Moodey	do	900 00	May 5, 1880	Ohio	do		
Miss Anna Platt	do	900 00	Aug. 1, 1865	South Carolina	do		
Miss Marie A. Robinson	do	900 00	June 1, 1880	Texas	do		
Miss Lutie G. Ramsay	do	900 00	July 1, 1881	West Virginia	do		
Mrs. Anna E. Stephenson	do	900 00	July 28, 1868	New York	do		

OFFICE OF THE REGISTER OF THE TREASURY—Continued.

Name.	Grade.	Compensation.	Date of appointment.	State to which charged.	White or colored.	War record.
Mrs. Maria Stierlin	Copyist and counter	$900 00	May 15, 1868	Missouri	White	
Miss Josephine M. Stoddard	do	900 00	July 15, 1871	Vermont	do	
Mrs. Nellie A. Taunt	do	900 00	Feb. 20, 1864	Pennsylvania	do	
Mrs. Annie C. Varden	do	900 00	June 8, 1868	Maryland	do	
Miss Susie Wasney	do	900 00	Feb. 14, 1868	District of Columbia	do	
Charles W. Walcott	do	900 00	Nov. 3, 1870	Vermont	do	Volunteer Army eleven months.
Lewis A. Walker	do	900 00	Nov. 10, 1873	District of Columbia	do	
Miss Hallie L. Wright	do	900 00	Dec. 1, 1866	Maryland	do	
Mrs. Hannah M. White	do	900 00	June 24, 1865	Wisconsin	do	
Mrs. Marietta L. Williams	do	900 00	July 20, 1865	Iowa	do	
Miss Nettie White	do	900 00	Dec. 2, 1868	District of Columbia	do	
Miss Martha A. Wood	do	900 00	Mar. 16, 1868	New Hampshire	do	
Mrs. Anna Yarnell	do	900 00	May 24, 1879	Rhode Island	do	
Charles E. Diemar	Messenger	840 00	Feb. 12, 1880	Illinois	do	Volunteer Army two years and seven months.
John B. Graves	Assistant messenger	720 00	Nov. 16, 1869	District of Columbia	do	Volunteer Army ninety days.
George L. Green	do	720 00	Sept. 1, 1874	do	Colored	
Henry Logan	do	720 00	May 1, 1869	do	do	
John H. Smith	do	720 00	Aug. 21, 1875	Maryland	do	
Isaac Taylor	do	720 00	Feb. 11, 1871	District of Columbia	White	
Frank P. Burgess	Laborer	660 00	Mar. 20, 1876	North Carolina	Colored	
Joseph C. Jackson	do	660 00	July 7, 1881	Mississippi	do	Volunteer Navy six months.
Alfred B. Lind	do	660 00	June 1, 1880	North Carolina	do	
John Middleton	do	660 00	May 15, 1871	District of Columbia	do	
Miss Mary F. Monroe	do	660 00	Nov. 1, 1877	Ohio	do	
John P. Turner	do	660 00	Dec. 8, 1877	Georgia	do	
Howard B. Whipple	do	660 00	Nov. 1, 1875	New York	White	
Temporary employés paid from lapse fund.						
Miss Ella Trumbull	Counter	900 00	Jan. 1, 1865	Minnesota	do	
Miss Sarah O'Neill	Laborer	660 00	Sept. 14, 1874	Michigan	do	
Mrs. Lyida K. White	do	660 00	Dec. 7, 1869	New Jersey	do	

OFFICE OF THE COMPTROLLER OF THE CURRENCY.

John S. Langworthy	Deputy comptroller	$2,800 00	Oct. 1, 1868	New York	White	
J. Franklin Bates	Chief of division	2,200 00	Aug. 21, 1864	Massachusetts	do	Volunteer Army three years.
William B. Greene	do	2,200 00	Mar. 23, 1871	Ohio	do	
John D. Patten	do	2,200 00	June 12, 1865	District of Columbia	do	
Edward Wolcott	do	2,200 00	July 1, 1865	Kansas	do	
John W. Griffin	Bond clerk	2,000 00	Apr. 22, 1865	New York	do	Regular Army one year.

James C. Brown	Clerk, class four	1,800 00	Jan. 27, 1873	Pennsylvania	....do	
Fernando C. Cate	.....do	1,800 00	Mar. 15, 1865	New York	....do	
Charles H. Cherry	.....do	1,800 00	July 1, 1865	....do	....do	
William Elder	.....do	1,800 00	Dec. 26, 1872	Pennsylvania	....do	
Charles H. Norton	.....do	1,800 00	Aug. 1, 1866	District of Columbia	....do	
William Sinclair	.....do	1,800 00	Jan. 18, 1871	Minnesota	....do	
George H. Wood	.....do	1,800 00	Oct. 21, 1865	District of Columbia	....do	Regular Army two and one-half years.
Thomas C. Folger	Stenographer	1,600 00	Apr. 2, 1880	New York	...do	
Charles E. Brayton	Clerk, class three	1,600 00	May 1, 1873	....do	....do	
David B. Brenner	.....do	1,600 00	July 1, 1874	Pennsylvania	....do	
William H. Glascott	.....do	1,600 00	Oct. 12 1871	Wisconsin	....do	Volunteer Army five years.
John A. Hebrew	.....do	1,600 00	May 12, 1873	Pennsylvania	....do	Volunteer Army three years.
George T. May	.....do	1,600 00	July 1, 1875	District of Columbia	....do	
Washington K. McCoy	.....do	1,600 00	Nov. 1, 1872	Maryland	... do	
Edmund E. Schreiner	.....do	1,600 00	Mar. 1, 1868	District of Columbia	....do	
Charles J. Stoddard	.....do	1,600 00	Dec. 17, 1864	Massachusetts	....do	
William D. Swan	.....do	1,600 00	Apr. 28, 1870	New York	....do	
Walter Taylor	.....do	1,600 00	Mar. 11, 1871	West Virginia	....do	
Edward D. Tracy	....do	1,600 00	Sept. 4, 1867	District of Columbia	....do	Volunteer Army three and one-half years.
Julius E. De Saules	Clerk, class two	1,400 00	May 29, 1869	....do	....do	
Joseph A. Kayser	.....do	1,400 00	Sept. 1, 1869	Virginia	....do	
Edward McCauley	.....do	1,400 00	Dec. 3, 1874	District of Columbia	....do	Marine Corps three years.
Isaac C. Miller	.....do	1,400 00	Jan. 28, 1871	Indiana	... do	
Charles McC. Taylor	.....do	1,400 00	Dec. 12, 1870	District of Columbia	....do	
William H. Walton	.....do	1,400 00	Jan. 2, 1873	New Jersey	....do	
Arthur M. Wheeler	.....do	1,400 00	Dec. 22, 1873	District of Columbia	....do	
Frederick Widdows	.....do	1,400 00	Nov. 18, 1871	... do	....do	
Mrs. Julia R. Donoho	Clerk, class one	1,200 00	July 16, 1872	Mississippi	....do	
Mrs. Sarah F. Fitzgerald	.....do	1,200 00	May 12, 1865	District of Columbia	....do	
Charles B. Henckley	.....do	1,200 00	Feb. 9, 1872	... do	....do	
R. Le Roy Livingston	.....do	1,200 00	Feb. 16, 1872	Minnesota	....do	
Irving B Brower	.....do	1,200 00	May 3, 1873	Illinois	....do	
Mrs. M. L. McCormick	.....do	1,200 00	Oct. 1, 1868	District of Columbia	....do	
Miss M. L. Simpson	.....do	1,200 00	Aug. 1, 1868	Delaware	....do	
Miss E. F. Morrill	.....do	1,200 00	July 15, 1875	Maine	....do	
Miss E. C. Bates	Clerk	1,000 00	Jan. 23, 1874	District of Columbia	....do	
Edward Myers	.....do	1,000 00	Nov. 1, 1865	....do	....do	
Miss E. M. Barker	.....do	900 00	Nov. 19, 1869	Ohio	....do	
Miss H. M. Black	.....do	900 00	Aug. 12, 1870	Delaware	....do	
Miss M. L. Browne	.....do	900 00	Jan. 1, 1871	Wisconsin	....do	
Mrs. K. R. Bruce	.....do	900 00	July 1, 1878	New York	....do	
Mrs. S. G. Clemens	.....do	900 00	Feb. 1, 1879	Ohio	....do	
Miss M. L. Conrad	.....do	900 00	July 1, 1873	District of Columbia	....do	
Miss May Crosby	.....do	900 00	July 15, 1875	Maine	....do	
Mrs. M. A. Curtis	.....do	900 00	Dec. 1, 1879	Minnesota	....do	
Miss F. M. Fleming	.....do	900 00	Jan. 10, 1873	New York	....do	
Miss M. E. Gooding	.....do	900 00	May 7, 1877	Indiana	....do	
Miss E. R. Hyde	.....do	900 00	Dec. 16, 1864	Vermont	....do	
Miss A. M. Kennedy	.....do	900 00	Apr. 26, 1871	Mississippi	....do	
Mrs. L. W. Knowlton	.....do	900 00	Aug. 7, 1878	Illinois	....do	
Mrs. M. B. Miller	.....do	900 00	Aug. 22, 1870	Alabama	....do	
Mrs. M. F. Ogden	.....do	900 00	Dec. 1, 1870	South Carolina	....do	

OFFICE OF THE COMPTROLLER OF THE CURRENCY—Continued.

Name.	Grade.	Compensation.	Date of appointment.	State to which charged.	White or colored.	War record.
Miss C. L. Pennock	Clerk	$900 00	July 1, 1870	Pennsylvania	White	
Miss E. M. Peters	do	900 00	Nov. 1, 1874	District of Columbia	do	
Mrs. A. E. Ranney	do	900 00	Aug. 17, 1875	Minnesota	do	
Mrs. E. H. Reed	do	900 00	June 1, 1879	Louisiana	do	
Miss M. Richardson	do	900 00	June 23, 1873	Maine	do	
Miss E. A. Saunders	do	900 00	Nov. 1, 1874	New Hampshire	do	
Mrs. F. C. Snead	do	900 00	Dec. 1, 1868	Kentucky	do	
Miss A. P. Stockdale	do	900 00	Feb. 17, 1870	Louisiana	do	
Mrs. S. A. W. Tiffey	do	900 00	Oct. 3, 1870	Virginia	do	
Mrs. J. C. Townsend	do	900 00	Mar. 2, 1874	New York	do	
John Newman	Messenger	840 00	July 1, 1880	do	do	
Mrs. Helen J. Durfee	Assistant Messenger	720 00	May 2, 1880	Minnesota	do	
William Griffiths	do	720 00	Sept. 1, 1880	Pennsylvania	do	
Thomas H. Austin	Watchman	720 00	Apr. 13, 1874	New York	do	
Thomas Jackson	do	720 00	Jan. 10, 1876	Minnesota	Colored	
L. W. Allen	Laborer	660 00	Mar. 1, 1881	Iowa	do	
Silas Holmes	do	660 00	Dec. 16, 1864	District of Columbia	do	
Lee Nance	do	660 00	Mar. 1, 1881	Mississippi	do	
Edward S. Peck	Superintendent	2, 000 00	June 14, 1865	New York	White	Volunteer Army three and one-half years.
Watson W. Eldridge	Teller	2, 000 00	Oct. 5, 1870	Michigan	do	Volunteer Army three years.
Frank A. Miller	Principal bookkeeper	2, 000 00	Feb. 15, 1869	New York	do	
Theodore O. Ebaugh	Assistant bookkeeper	2, 000 00	Mar. 23, 1865	New York	do	Volunteer Army sixty days.
Miss L. Campbell	Clerk	900 00	July 15, 1875	Pennsylvania	do	
Miss V. H. Clark	do	900 00	July 1, 1875	Minnesota	do	
Miss M. F. Dewar	do	900 00	July 1, 1875	Wisconsin	do	
Miss Jane A. Dorr	do	900 00	July 1, 1875	New York	do	
Mrs. A. H. Finlay	do	900 00	July 1, 1875	Pennsylvania	do	
Miss E. Hutchinson	do	900 00	July 1, 1875	Ohio	do	
Miss E. Lafayette	do	900 00	July 1, 1875	Indiana	do	
Mrs. M. F. Nessle	do	900 00	May 1, 1880	Pennsylvania	do	
Mrs. M. E. Oliver	do	900 00	Nov. 1, 1874	do	do	
Philo Burr	Assistant messenger	720 00	Mar. 8, 1868	Iowa	do	
Temporary employés, paid from lapse-fund.						
John Cunningham	Clerk	900 00	July 1, 1881	West Virginia	do	
Miss Carrie E. Martin	do	900 00	Sept. 20, 1881	Alabama	do	
Miss Annie P. Luttrell	do	900 00	Sept. 1, 1881	Colorado	do	
Mrs. Hattie T. Hamilton	do	900 00	Sept. 1, 1880	Indiana	do	

William T. Clark	Chief clerk	2,500 00	Apr. 12, 1880	Texas	White	Volunteer Army four years and eleven months.
Alexander H. Holt	Head of division	2,500 00	Aug. 21, 1869	Illinois	do	Volunteer Army three years.
William H. Armstrong	do	2,250 00	Mar. 9, 1867	Pennsylvania	do	
Charles A. Bates	do	2,250 00	Aug. 27, 1864	New Jersey	do	
Thomas A. Cushing	do	2,250 00	Sept. 5, 1864	New Hampshire	do	
Oscar F. Dana	do	2,250 00	Mar. 7, 1867	Maine	do	
Israel Kimball	do	2,250 00	Oct. 8, 1862	New Hampshire	do	
Henry Conquest Clarke	Stenographer	1,800 00	Nov. 1, 1877	Louisiana	do	
Samuel G. Arnold	Clerk, fourth class	1,800 00	Feb. 24, 1863	Ohio	do	
Nelson R. Baker	do	1,800 00	Nov. 23, 1863	Maryland	do	
Felix Barrère	do	1,800 00	Sept. 5, 1864	Wisconsin	do	
Alfred G. Bliss	do	1,800 00	Aug. 20, 1869	Connecticut	do	Volunteer Army three years.
Edward H. Breckinridge	do	1,800 00	Sept. 28, 1864	New York	do	
Samuel J. Butterfield	do	1,800 00	May 3, 1869	Pennsylvania	do	
Lendall A. Conner	do	1,800 00	Jan. 18, 1866	New Hampshire	do	Volunteer Army three years.
Cornelius S. Dyer	do	1,800 00	June 2, 1877	Rhode Island	do	Volunteer Army two years.
James H. Elliot	do	1,800 00	Feb. 1, 1869	Massachusetts	do	Volunteer Army two years and six months.
Lyman L. Emery	do	1,800 00	May 3, 1869	Vermont	do	Volunteer Army one year.
Thomas I. Gardner	do	1,800 00	Dec. 3, 1867	District of Columbia	do	
Samuel H. Goodman	do	1,800 00	Aug. 27, 1869	Illinois	do	
Edwin H. Grant	do	1,800 00	Nov. 26, 1867	Kansas	do	Volunteer Army four years.
Edwin S. Holmes	do	1,800 00	Nov. 3, 1867	District of Columbia	do	
John Irwin	do	1,800 00	Mar. 1, 1874	Maryland	do	
Wolcott Lay	do	1,800 00	June 1, 1866	New Jersey	do	Volunteer Army two years.
Jeremiah C. Lotz	do	1,800 00	Sept. 29, 1862	Indiana	do	
William H. Mills	do	1,800 00	July 1, 1875	Maine	do	
Miss Jane M. Seavy	do	1,800 00	Jan. 10, 1863	Tennessee	do	
Samuel L. Stephenson	do	1,800 00	Nov. 12, 1869	Illinois	do	Volunteer Army three years.
John B. Taylor	do	1,800 00	Oct. 25, 1862	Pennsylvania	do	
Isaac Thornton	do	1,800 00	May 6, 1866	Vermont	do	Volunteer Navy four years.
James B. T. Tupper	do	1,800 00	Oct. 5, 1866	Massachusetts	do	Volunteer Army two years and four months.
J. Lee Adams	Clerk, third class	1,600 00	May 11, 1855	District of Columbia	do	Volunteer Army three months.
Edwin J. Bachman	do	1,600 00	May 8, 1869	Indiana	do	Volunteer Army over three years.
Charles T. Benedict	do	1,600 00	Sept. 25, 1865	New York	do	Volunteer Army three years.
Felix Brannigan	do	1,600 00	Dec. 1, 1865	Mississippi	do	Volunteer Army.
Robert S. Brown	do	1,600 00	Aug. 1, 1867	Illinois	do	Volunteer Army eighteen months.
William B. Brown	do	1,600 00	July 7, 1869	Ohio	do	Volunteer Army.
Benjamin H. Collins	do	1,600 00	June 19, 1871	District of Columbia	do	Volunteer Army eighteen months.
John G. Cook, jr	do	1,600 00	Aug. 3, 1865	do	do	Volunteer Army fifteen months.
William W. Dean	do	1,600 00	Jan. 27, 1865	New York	do	
James Du Bois	do	1,600 00	Aug. 1, 1868	do	do	Volunteer Army four years and five months.
Alfred W. Gannett	do	1,600 00	June 9, 1863	do	do	Volunteer Army ten and one-half months.
Charles W. Hancock	do	1,600 00	June 1, 1869	District of Columbia	do	
Wales Hubbard, jr	do	1,600 00	Jan. 26, 1870	Maine	do	
Charles H. Ingram	do	1,600 00	May 3, 1873	Pennsylvania	do	Volunteer Army three years and one month.
Samuel A. Lewis	do	1,600 00	July 3, 1863	Rhode Island	do	Volunteer Army one year.
Jacob H. Lichliter	do	1,600 00	May 1, 1873	Virginia	do	
William J. Morris	do	1,600 00	June 1, 1878	Ohio	do	

OFFICE OF THE COMMISSIONER OF INTERNAL REVENUE—Continued.

Name.	Grade.	Compensation.	Date of appointment.	State to which charged.	White or colored.	War record.
James H. Pilson	Clerk, third class	$1,600 00	July 18, 1868	Pennsylvania	White	Volunteer Army three years and four months.
Charles F. Raun	do	1,600 00	Jan. 26, 1874	New York	do	
George W. Rich	do	1,600 00	May 1, 1873	District of Columbia	do	Volunteer Army three years.
Charles Scott	do	1,600 00	Feb. 1, 1879	Illinois	do	Do.
Henry H. Service	do	1,600 00	Apr. 30, 1869	Virginia	do	Volunteer Army two years.
John W. Stokes	do	1,600 00	Sept. 28, 1864	Pennsylvania	do	
Samuel S. Sumner	do	1,600 00	June 30, 1864	New York	do	Volunteer Army four years.
Edwin M. Truell	do	1,600 00	Dec. 11, 1869	Wisconsin	do	Volunteer Army three years.
Miss Mary Van Vranken	do	1,600 00	Oct. 26, 1865	New York	do	
Miss Annie E. Adams	Clerk, second class	1,400 00	May 14, 1864	District of Columbia	do	
Stephen A. Aplin	do	1,400 00	Sept. 21, 1879	Rhode Island	do	
Byron O. Billingsley	do	1,400 00	July 1, 1875	Kentucky	do	
Charles A. Brown	do	1,400 00	July 20, 1865	Maine	do	Volunteer drummer four years.
Seth S. Bryant	do	1,400 00	Oct. 17, 1862	New York	do	
James H. Cavanaugh	do	1,400 00	Nov. 10, 1869	District of Columbia	do	Volunteer Army three years.
Richard A Charles	do	1,400 00	Feb. 22, 1867	New York	do	Do.
Spencer A. Coe	do	1,400 00	Nov. 1, 1869	Virginia	do	
Josiah Q. Crosby	do	1,400 00	May 1, 1873	Massachusetts	do	Volunteer Army three years.
Benjamin S. Cross	do	1,400 00	Dec. 19, 1876	Indiana	do	
Henry N. Crutchett	do	1,400 00	May 3, 1873	District of Columbia	do	Volunteer Army three years.
Miss Nanette R. Draper	do	1,400 00	June 1, 1870	Kansas	do	
James M. Edgar	do	1,400 00	Dec. 1, 1877	Alabama	do	Volunteer Army three years.
James W. Farrar	do	1,400 00	June 3, 1867	District of Columbia	do	
Eugene Lee Grant	do	1,400 00	Jan. 20, 1870	Pennsylvania	do	Volunteer Army three years.
George A. Hilton	Clerk, second class	1,400 00	July 23, 1875	New York	do	Volunteer Army one year.
John S. Hollingshead	do	1,400 00	Jan. 4, 1870	District of Columbia	do	
Miss Helen R. Holmes	do	1,400 00	May 2, 1873	Massachusetts	do	
Charles J. Hutchins	do	1,400 00	Oct. 19, 1865	Maine	do	
Philip C. Hyam	do	1,400 00	June 30, 1876	New York	do	
George Jessup	do	1,400 00	Nov. 8, 1869	do	do	Volunteer Army four years and two months.
Tom E. King	do	1,400 00	Oct. 21, 1869	Ohio	do	
Miss Emma A. McCully	do	1,400 00	Nov. 3, 1865	South Carolina	do	
Charles E. Mallam	do	1,400 00	Jan. 27, 1871	Virginia	do	Volunteer Army three years and five months.
William L. Marcy	do	1,400 00	May 14, 1873	Pennsylvania	do	Volunteer Army nine months.
James H. May	do	1,400 00	July 17, 1875	Indiana	do	Volunteer Army four years.
Louis Y. Mitchell	do	1,400 00	May 13, 1869	Ohio	do	Ohio Volunteers four years and nine months.
Theodor Poesche	do	1,400 00	Jan. 5, 1863	District of Columbia	do	
Miss Lavinia S. Ralston	do	1,400 00	Mar. 19, 1868	New York	do	
George F. Rollins	do	1,400 00	May 11, 1865	New Hampshire	do	
Michael Sells	do	1,400 00	Mar. 13, 1869	Ohio	do	Ohio Volunteers three years and nine months.
Charles L. Siemens	do	1,400 00	Sept. 2, 1869	Pennsylvania	do	
Augustus Smith	do	1,400 00	Jan. 18, 1869	Connecticut	do	
Robert D. Swingle	do	1,400 00	Mar. 5, 1869	West Virginia	do	
John G. Townsend	do	1,400 00	Jan. 24, 1869	Pennsylvania	do	

Miss Helen E. Williams	do	1,400 00	July 1, 1875	Rhode Island	do	
Miss Henrietta Cowperthwait.	Clerk, first class	1,200 00	Jan. 3, 1863	Pennsylvania	do	
Lamberton Doolittle	do	1,200 00	Aug. 21, 1880	West Virginia	do	Volunteer Army two years and three months.
Milton Durnall	do	1,200 00	July 14, 1869	Pennsylvania	do	
Samuel M. Findley	do	1,200 00	Feb. 2, 1880	Illinois	do	
William B. Genella	do	1,200 00	July 5, 1877	Colorado	do	
Abraham L. Guss	do	1,200 00	Dec. 16, 1879	Pennsylvania	do	
Mrs. M. A. Hockaday	do	1,200 00	Oct. 19, 1874	Kentucky	do	
Jerome A. Johnson	do	1,200 00	May 27, 1869	District of Columbia	Colored	Volunteer Army one year and eight months.
Ernest A. Main	do	1,200 00	Jan. 25, 1881	Wisconsin	White	
Joseph F. Marsden	do	1,200 00	Mar. 24, 1869	Pennsylvania	do	
Charles H. Mytinger	do	1,200 00	Aug. 23, 1875	do	do	
Miss Marion Purviance	do	1,200 00	Jan. 21, 1863	Indiana	do	
James P. Saffold	do	1,200 00	July 1, 1878	Alabama	do	
Benjamin F. Stearns	do	1,200 00	Jan. 24, 1880	Ohio	do	Volunteer Army three and one-half years.
Mrs. Anna E. Stevenson	do	1,200 00	Jan. 16, 1871	Minnesota	do	
Christian Storm	do	1,200 00	Dec. 11, 1878	Wisconsin	do	Volunteer Army three months.
Mrs. Laura P. Tyndale	do	1,200 00	Apr. 3, 1872	Illinois	do	
John A. Vail	do	1,200 00	Oct. 16, 1878	Indiana	do	
Addison Walker	do	1,200 00	Dec. 15, 1880	Iowa	do	Volunteer Army twenty-two months.
Miss Virginia Davidson	Clerk	1,000 00	Nov. 13, 1871	District of Columbia	do	
Miss Mary De Mowbray	do	1,000 00	May 1, 1877	Iowa	do	
Miss Victoria A. Dimock	do	1,000 00	Feb. 15, 1870	Pennsylvania	do	
George M. Fillmore	do	1,000 00	Oct. 1, 1881	Nebraska	do	Reg. and Vol. Army one year and ten months.
Miss Ellen P. Fisher	do	1,000 00	Oct. 17, 1865	Maine	do	
Mrs. E. L. Heap	do	1,000 00	Aug. 16, 1871	District of Columbia	do	
Miss Ada J. Joyner	do	1,000 00	Mar. 31, 1866	Vermont	do	
Miss Mary Cecelia King	do	1,000 00	June 27, 1867	Maryland	do	
Mrs. Cordelia Leas	do	1,000 00	Feb. 28, 1867	Missouri	do	
Mrs. E. G. Manning	do	1,000 00	July 1, 1878	Alabama	do	
Mrs. Laura D. Ralston	do	1,000 00	Sept. 2, 1867	New York	do	
Emanuel Speich	do	1,000 00	June 1, 1881	Nebraska	do	
Miss Mary Willard	do	1,000 00	Jan. 16, 1865	New York	do	
Miss Eliza M. Bartlett	Clerk	900 00	Apr. 16, 1876	Arkansas	do	
Miss Maggie M. Billing	do	900 00	July 16, 1877	North Carolina	do	
Mrs. Mary E. Boarman	do	900 00	Mar. 6, 1876	Indiana	do	
Mrs. M. E. Bowman	do	900 00	Dec. 16, 1877	Iowa	do	
Mrs. Virginia Brewster	do	900 00	Dec. 1, 1878	District of Columbia	do	
Benjamin F. Brockett	do	900 00	Oct. 5, 1878	Illinois	do	Volunteer Army two years.
Miss Anne Carson	do	900 00	Sept. 6, 1874	Pennsylvania	do	
Mrs. Frances S. Chapman	do	900 00	May 1, 1878	Illinois	do	
Mrs. Nettie A. Cheeks	do	900 00	Oct. 16, 1880	Kentucky	do	
Miss Isabel Cowlam	do	900 00	July 5, 1877	Illinois	do	
Miss Mary J. Dearr	do	900 00	Jan. 6, 1872	Pennsylvania	do	
Mrs. Julia DeQuindre	do	900 00	Apr. 18, 1866	Michigan	do	
Miss Annie F. Drysdale	do	900 00	May 28, 1869	New York	do	
Mrs. Josie L. Evans	do	900 00	Aug. 16, 1869	Illinois	do	
Miss Gertrude L. Farrelly	do	900 00	Apr. 2, 1880	Pennsylvania	do	
Miss Emma A. Fox	do	900 00	Apr. 16, 1876	Connecticut	do	
Miss Amanda Garrett	do	900 00	Sept. 15, 1870	Indiana	do	
Miss Elizabeth C. Hallett	do	900 00	Dec. 1, 1878	Wisconsin	do	

OFFICE OF THE COMMISSIONER OF INTERNAL REVENUE—Continued.

Name.	Grade.	Compensation.	Date of appointment.	State to which charged.	White or colored.	War record.
Mrs. Cornelia J. Hagan	Clerk	$900 00	Mar. 1, 1876	Ohio	White	
Miss Lizzie R. Henderson	do	900 00	May 1, 1881	District of Columbia	do	
Miss Ada J. Hepinstall	do	900 00	May 28, 1869	New York	do	
Miss Anna B. Hieskell	do	900 00	Apr. 16, 1876	District of Columbia	do	
Mrs. Josie J. Horton	do	900 00	June 23, 1873	Rhode Island	do	
Mrs. Anne R. Hull	do	900 00	Mar. 12, 1872	Virginia	do	
Miss Susan M. Jackson	do	900 00	May 28, 1877	Rhode Island	do	
Mrs. Mary A. Johnson	do	900 00	Jan. 17, 1863	District of Columbia	do	
Miss Catherine A. Johnston	do	900 00	July 1, 1877	Tennessee	do	
Miss Myra Kessler	do	900 00	July 31, 1879	Ohio	do	
Mrs. Mary Langtree	do	900 00	July 1, 1878	New York	do	
Miss Sarah W. Lawrence	do	900 00	June 5, 1877	Michigan	do	
Miss Lily H. Levy	do	900 00	Nov. 1, 1877	South Carolina	do	
Miss C. F. Marean	do	900 00	Nov. 1, 1879	Pennsylvania	do	
Mrs. Matilda M. Mason	do	900 00	Aug. 13, 1870	Ohio	do	
Miss Fannie G. McDowell	do	900 00	Aug. 1, 1870	Pennsylvania	do	
Miss Belle C. Merrifield	do	900 00	July 17, 1876	Virginia	do	
Mrs. M. C. Miller	do	900 00	Feb. 22, 1875	Ohio	do	
Mrs. Jennie M. Nichols	do	900 00	June 13, 1870	Massachusetts	do	
Miss Louisa J. Otis	do	900 00	July 1, 1878	New York	do	
Miss Marcelia A. Plant	do	900 00	Nov. 16, 1874	District of Columbia	do	
Miss Lurena P. Price	do	900 00	Sept. 1, 1875	do	do	
Mrs. Agnes Pugsley	do	900 00	Feb. 1, 1880	New York	do	
Miss Kate J. Rorer	do	900 00	Jan. 3, 1878	Missouri	do	
Miss Laura E. Scott	do	900 00	July 1, 1878	North Carolina	do	
Miss Sarah L. Smith	do	900 00	Jan. 17, 1876	New York	do	
Miss Sarah W. Stevenson	do	900 00	Dec. 1, 1878	Kentucky	do	
Mrs. Sue Tilley	do	900 00	Mar. 3, 1876	Indiana	do	
Miss Belle Varney	do	900 00	Sept. 16, 1870	Maine	do	
Miss Sallie R. Welch	do	900 00	Apr. 1, 1880	Kansas	do	
Miss Kate E. White	do	900 00	July 2, 1873	Illinois	do	
Miss Mary B. Whitehill	do	900 00	July 1, 1869	Pennsylvania	do	
Robert A. Davis	Assistant messenger	720 00	July 1, 1869	District of Columbia	Colored	Volunteer Navy two years.
John W. Hunter	do	720 00	Feb. 1, 1868	do	do	Navy four years.
James Morris	do	720 00	Jan. 20, 1875	Pennsylvania	White	Volunteer Army three years.
Robert Strachan	do	720 00	Feb. 10, 1871	Virginia	Colored	
Peter J. Crenshaw	Laborer	660 00	Sept. 1, 1881	Alabama	do	Volunteer Army two years and four months.
Uriah Daly	do	660 00	Jan. 3, 1864	District of Columbia	do	
William Fitzgerald	do	660 00	Jan. 15, 1880	Illinois	White	Volunteer Army three years.
Frank R. Freeman	do	660 00	Nov. 4, 1863	District of Columbia	Colored	
Gilbert Gray	do	660 00	June 7, 1872	do	do	
Charles A. Harriday	do	660 00	Nov. 10, 1869	do	do	
William Hayes	do	660 00	July 11, 1878	Kentucky	White	Volunteer Army four years.
William Murrell	do	660 00	May 2, 1881	Louisiana	Colored	Volunteer Army three years.

Stafford Payne	do	660 00	July 6, 1869	District of Columbia	do	
John L. Webster	do	660 00	Feb. 7, 1878	do	do	
Temporarily employed and paid from lapse-fund.						
George Anthony	Clerk	900 00	May 2, 1881	Pennsylvania	White	
Mrs. Elizabeth Hartman	do	900 00	May 2, 1881	Michigan	do	
Paid from the appropriation for dies, paper, and stamps.						
Charles F. Lewis	Superintendent of stamp vault	2, 000 00	Sept. 28, 1877	New York	White	Army two years.
Winfield S. S. Walters	Bookkeeper	1, 800 00	Jan. 1, 1880	Illinois	do	
F. Lewis Marshall	Chief packer and shipping clerk	1, 200 00	Oct. 25, 1373	Virginia	do	
Orlando D. Summy	Assistant packer and shipping clerk	1, 200 00	Oct. 9, 1877	District of Columbia	do	
Francis W. Hayden	Clerk	1, 000 00	May 3, 1877	Maryland	do	
Miss Hattie Bartlett	Counter	900 00	Jan. 4, 1872	Maine	do	
Miss H. May Bennett	do	900 00	Dec. 15, 1880	Pennsylvania	do	
Miss Carrie Bradford	do	900 00	July 15, 1880	Massachusetts	do	
Mrs. A. A. Clampitt	do	900 00	Sept. 11, 1880	District of Columbia	do	
Miss M. E. Clements	do	900 00	July 1, 1880	Iowa	do	
Miss M. E. Farquhar	do	900 00	Jan. 15, 1881	Pennsylvania	do	
Mrs. Kitty S. Foos	do	900 00	Dec. 4, 1879	Ohio	do	
Miss Mary J. Handy	do	900 00	Aug. 14, 1872	District of Columbia	do	
Mrs. Laura J. Herron	do	900 00	Dec. 18, 1880	Ohio	do	
Mrs. Sallie Humphreys	do	900 00	July 1, 1880	District of Columbia	do	
Mrs. Jennie Jones	do	900 00	July 1, 1880	do	do	
Miss Eleanor Kearney	do	900 00	Mar. 10, 1879	New York	do	
Miss C. C. Kellogg	do	900 00	Oct. 9, 1877	Illinois	do	
Miss Columbia Kelley	do	900 00	May 1, 1880	District of Columbia	do	
Mrs. Mattie Lathrop	do	900 00	Oct. —, 1877	Vermont	do	
Miss Fannie Lovell	do	900 00	Nov. 1, 1879	California	do	
Miss Sadie L. Paige	do	900 00	July 1, 1880	Massachusetts	do	
Miss Clara G. Quint	do	900 00	Mar. 7, 1881	New Hampshire	do	
Mrs. L. E. Skelton	do	900 00	Nov. 1, 1877	West Virginia	do	
Miss Juliet Solger	do	900 00	June 1, 1878	Massachusetts	do	
Miss Helen F. Soulé	do	900 00	Mar. 10, 1879	New York	do	
Miss Helen R. Stanford	do	900 00	Mar. 12, 1867	District of Columbia	do	
Miss Matilda Stoffregen	do	900 00	Oct. 10, 1880	do	do	
Mrs. Nannie M. Strause	do	900 00	Oct. 18, 1880	Ohio	do	
Mrs. Elizabeth Templeton	do	900 00	Oct. 6, 1877	District of Columbia	do	
George W. Alexander	Assistant messenger	720 00	Mar. 8, 1878	do	Colored	
Louis Davis	do	720 00	Sept. 28, 1880	Illinois	do	
George W. Elam	do	720 00	Jan. 4, 1881	Virginia	White	Army four years.
David L. Holley	do	720 00	Aug. 9, 1880	New York	do	
Daniel Keyes	do	720 00	Aug. 7, 1880	Rhode Island	Colored	
Edwin King	do	720 00	Sept. 28, 1880	District of Columbia	do	
Albert H. Lucas	do	720 00	May 3, 1878	do	do	Army three years.
Romine P. Scott	do	720 00	Feb. 2, 1881	Delaware	White	Army two years.

OFFICE OF THE COMMISSIONER OF INTERNAL REVENUE—Continued.

Name.	Grade.	Compensation.	Date of appointment.	State to which charged.	White or colored.	War record.
Willie R. Hantz	Laborer	$660 00	July 1, 1880	District of Columbia	White	
Ernest N. Thockmorton	do	660 00	Sept. 9, 1880	do	do	
Paid from appropriation for detecting and bringing to trial and punishment persons guilty of violating the internal revenue laws.						
August Henkel	Clerk, first class	1,200 00	Aug. 13, 1880	Ohio	White	Army four years.
Mrs. A. L. Bodfish	Clerk	900 00	Dec. 3, 1879	North Carolina	do	
Miss Margaret Hanna	do	900 00	Dec. 1, 1878	Virginia	do	
Miss Ida F. Neumeyer	do	900 00	June 1, 1878	District of Columbia	do	
Robert Colbert	Assistant messenger	720 00	Sept. 1, 1875	do	Colored	

COAST AND GEODETIC SURVEY.

J. E. Hilgard	Assistant in charge	4,200 00	Apr. —, 1845	Illinois		
George Davidson	Assistant	3,730 00	Jan. 1, 1846	Pennsylvania		Military Department Florida, spring of 1862.
R. D. Cutts	do	3,620 00	June 1, 1843	District of Columbia		U. S. Army, 1861 to 1865, inclusive.
C. O. Boutelle	do	3,620 00	Jan. 8, 1844	Massachusetts		U. S. Navy, Atlantic Squadron, hydrographer, 1861 to 1865, inclusive.
Henry Mitchell	do	3,200 00	Oct. 20, 1851	do		Military Department North Corolina; nine months, 1862.
H. L. Whiting	do	3,160 00	July —, 1838	New York		Military Department Virginia, summer of 1861.
F. H. Gerdes	do	3,150 00	June 20, 1836	Alabama		U. S Navy, Gulf Squadron, in 1862, '63, '64, '65.
George W. Dean	do	2,870 00	Jan. 1, 1850	Massachusetts		Military Department Virginia, December, 1863, to March, 1864.
C. S. Peirce	do	2,870 00	July 1, 1861	do		
C. A. Schott	do	2,760 00	Dec. 6, 1848	District of Columbia		Military Department Virginia, in 1863 and '64.
W. W. Cooper	do	2,750 00	Feb. 1, 1854	Pennsylvania		
W. E. Greenwell	do	2,750 00	Jan. —, 1845	Maryland		
A. F. Rodgers	do	2,640 00	Jan. —, 1847	District of Columbia		
George A. Fairfield	do	2,180 00	June 23, 1849	Maine		Military Department North Carolina, in 1863 and '64.
J. A. Sullivan	do	1,635 00	Oct. —, 1854	Massachusetts		Military Department Virginia, November, 1864, to August, 1865.
James S. Lawson	do	2,120 00	Jan. 1, 1848	Pennsylvania		
Cleveland Rockwell	do	2,120 00	July 1, 1856	New York		Military Departments Virginia, Tennessee, North Carolina, and Ohio, in 1861, '62, '63, '64, and '65.

Edwin Hergesheimer	Assistant	2,100 00	Oct. 1,1851	Pennsylvania		Military Department Virginia, summer, 1864.
A. W. Longfellow	do	2,070 00	July 8,1847	Maine		Military Department Virginia, spring, 1862.
W. H. Dennis	do	2,070 00	Dec. —,1855	Massachusetts		U. S. Navy, Florida and South Carolina, and in Military Departments Virginia and Georgia, in 1861, '64, and '65,
Edward Goodfellow	do	2,010 00	Aug. 1,1848	Pennsylvania		U. S. Volunteers three months, 1864.
Charles M. Bache	do	2,010 00	Jan. 18,1851	do		Military Department Maryland and Virginia, 1861, '63, and '64.
John W. Donn	do	2,010 00	Nov. 7,1859	District of Columbia		Military Departments Virginia, Tennessee, and North Carolina, in 1864 and '65.
A. T. Mosman	do	2,010 00	June 11,1856	Massachusetts		Military Departments Florida and Virginia, in 1861, '62, '63, and '64.
R. M. Bache	do	2,010 00	Dec. 1,1851	Pennsylvania		Military Department Missouri, spring, 1862.
C. H. Boyd	do	1,950 00	Oct. 1,1855	Maine		Military Departments North Carolina, Georgia, and Tennessee, in 1862, '64, '65.
Charles Hosmer	do	1,950 00	Feb. 1,1857	Ohio		Military Departments Virginia and Texas, in 1861, '63, '64.
C T. Iardella	do	1,900 00	May 26,1846	District of Columbia		Military Departments Florida and Maryland, in 1862, '63, and '64.
J. S. Bradford	do	1,900 00	Jan. 4,1856	Pennsylvania		U. S. Navy, South Carolina, North Carolina, and Virginia, in 1862, '63, and '64.
Spencer C. McCorkle	do	1,840 00	Aug. 1,1848	do		
R. E. Halter	do	1,800 00	Nov. 1,1853	District of Columbia		Military Departments Virginia, North Carolina, and South Carolina, in 1862, '63, '64, '65.
Louis A. Sengteller	do	1,750 00	July 1,1862	do		U. S. Navy, Florida and South Carolina, in 1863, '64, and '65.
Herbert G. Ogden	do	1,750 00	Apr. 22,1863	New Jersey		U. S. Navy, North Carolina, in 1863 and '64.
Gershom Bradford	do	1,750 00	June 1,1863	New Hampshire		U. S. Navy, North Carolina and South Carolina, in 1864 and '65.
H. L. Marindin	do	1,600 00	Nov. 26,1863	New York		U. S. Navy and U. S. Army, Military Department North Carolina, in 1863, '64, and '65.
William Eimbeck	do	1,750 00	July 1,1870	Missouri		
J. J. Gilbert	do	1,600 00	July 1,1864	Ohio		U. S. Navy, North Carolina and South Carolina, in 1864 and '65.
F. Walley Perkins	do	1,600 00	June 10,1863	New York		U. S. Navy, Mississippi, in 1864 and '65.
Stehman Forney	do	1,600 00	Jan. 1,1865	Pennsylvania		Military Department Georgia, in 1864 and '65.
O. H. Tittmann	do	1,750 00	Nov. 10,1867	Missouri		
F. D. Granger	do	1,500 00	July 1,1864	Massachusetts		Military Department Georgia, in 1864 and '65.
B. A. Colonna	do	1,600 00	Oct. 1,1870	Virginia		
Edwin Smith	do	1,500 00	Jan. 8,1870	New York		
Eugene Ellicott	do	1,500 00	July 1,1864	Maryland		
Andrew Braid	do	1,500 00	Dec. 13,1869	Pennsylvania		
William H. Dall	do	1,600 00	July 1,1871	Massachusetts		
H. W. Blair	Subassistant	1,350 00	Jan. —,1872	Virginia		
E. F. Dickins	do	1,300 00	Feb. 1,1871	California		
Jos. Hergesheimer	do	1,100 00	May 1,1867	Pennsylvania		
W. Irving Vinal	do	1,100 00	Dec. 1,1866	do		
D. B. Wainwright	do	1,200 00	Mar. 1,1870	District of Columbia		
I. F. Pratt	do	1,100 00	Nov. 1,1871	Vermont		
James B. Baylor	do	1,100 00	Jan. 10,1873	Virginia		
John B. Weir	do	1,100 00	Dec. 1,1872	Tennessee		
C. H. Sinclair	do	1,100 00	Nov. 14,1873	Virginia		

COAST AND GEODETIC SURVEY—Continued.

Name.	Grade.	Compensation.	Date of appointment.	State to which charged.	White or colored.	War record.
W. C. Hodgkins	Aid	p. m. $75 00	Sept. —, 1872	Maine		
F. H. Parsons	do	p. m. 75 00	Nov. —, 1873	Ohio		
C. H. Van Orden	do	p. m. 75 00	June 1, 1870	New York		
Robert A. Marr	do	p. m. 75 00	June —, 1878	Tennessee		
John E. McGrath	do	p. m. 60 00	June —, 1878	Arkansas		
Isaac Winston	do	p. m. 60 00	July —, 1878	Alabama		
Carlisle Terry, jr	do	p. m. 60 00	May —, 1878	Georgia		
P. A. Welker	do	p. m. 75 00	July —, 1879	Ohio		
George F. Bird	do	p. m. 50 00	Aug. —, 1879	Missouri		
Thomas P. Borden	do	p. m. 45 00	July 14, 1879	Texas		
Fremont Morse	do	p. m. 75 00	Sept. —, 1879	California		
E. L. Taney	do	p. m. 45 00	July —, 1879	Maine		
Samuel Hein	Librarian	1,800 00	Apr. 9, 1834	New York		
W. B. Chilton	Clerk to Superintendent	p. d. 3 50	Dec. 1, 1875	District of Columbia		
J. W. Porter	Disbursing agent	2,500 00	Mar. 6, 1877	Illinois		
W. A. Herbert	Accountant	1,600 00	July 1, 1866	District of Columbia		
John R. Barker	Coast Pilot compiler	p. m. 125 00	July 19, 1873	Pennsylvania		
John W. Parsons	do	p. m. 100 00	Jan. 1, 1876	Maryland		
Marcus Baker	Coast Pilot compiler	1,650 00	Mar. 1, 1873	Michigan		
G. Rumpf	Computer	1,740 00	Apr. 1, 1849	New Jersey		
M. H. Doolittle	do	p. d. 5 75	Apr. 14, 1873	District of Columbia		
Jermain G. Porter	do	p. m. 115 00	Oct. 1, 1878	New York		
A. S. Christie	do	p. m. 100 00	Jan. 15, 1879	Massachusettst		
Henry Farquhar	do	p. m. 105 00	Apr. 13, 1872	Maryland		
C. H. Kummell	do	p. m. 100 00	Nov. 6, 1880	Michigan		
Charles Henderson	Writer	p. m. 50 00	Apr. 17, 1880	District of Columbia		
E. S. Avery	Tide-computer	2,000 00	Oct. 16, 1853	Connecticut		
Thomas Craig	do	1,500 00	July 1, 1869	Maryland		
L. P. Shidy	do	p. m. 75 00	May 20, 1873	Missouri		
M. Thomas	do	p. m. 60 00	July 1, 1854	Ohio		
M. E. Nesbitt	Writer	p. m. 60 00	Oct. 1, 1874	District of Columbia		
W. B. French	Clerk	p. m. 100 00	July 1, 1872	....do		
C. D. Gedney	Stenographer	p. m. 80 00	Jan. 13, 1879	....do		
W. T. Bright	Draughtsman	2,050 00	Feb. —, 1853	....do		
A. Lindenkohl	do	2,350 00	July —, 1854	....do		Military Department Virginia, in 1863 and '64.
L. Karcher	do	p. d. 5 75	Apr. 1, 1857	New York		
P. Erichsen	do	p. d. 4 00	Oct. 8, 1870	District of Columbia		
E. Molkow	do	p. d. 4 00	Apr. 14, 1866	....do		U. S. Volunteers in 1861, '62, '64, and '65.
E. J. Sommer	do	p. d. 4 00	July 1, 1870	Massachusetts		
T. J. O'Sullivan	do	p. m. 100 00	Feb. 1, 1880	Virginia		
Edwin H. Fowler	do	p. m. 90 00	July 9, 1879	New Hampshire		
R. E. Peary	do	p. m. 90 00	July 10, 1879	Maine		
A. B. Graham	do	p. m. 83 00	July 10, 1879	Virginia		
A. E Burton	do	p. m. 83 00	July 10, 1879	Maine		

J. C. Barr	Writer	1,000 00	June 14, 1880	Pennsylvania	
E. Willenbucher	Hydrographic draughtsman	2,000 00	July 9, 1863	South Carolina	U. S. Navy, 1861 to 1865.
Charles Junken	....do	1,800 00	Nov. 1, 1856	New York	U. S. Navy, in 1861 and 1865.
W. C. Willenbucher	....do	1,200 00	Mar. 1, 1873	District of Columbia	
F. C. Down	....do	p. d. 3 83½	July 1, 1871	Virginia	
Ferdinand Westdahl	....do	p. m. 150 00	Jan. 1, 1872	California	
A. E. Maedel	Engraver	2,000 00	Apr. 13, 1857	District of Columbia	
A. Sengteller	....do	1,800 00	Apr. 1, 1856	....do	
H. M. Knight	....do	p. d. 5 75	July 1, 1870	Pennsylvania	United States Volunteers, April, 1861, to May, 1863.
W. A. Thompson	....do	p. d. 5 75	May 24, 1855	District of Columbia	
A. Petersen	....do	p. d. 5 50	July —, 1855	Pennsylvania	
J. G. Thompson	....do	p. d, 5 50	Jan. 1, 1860	District of Columbia	
Edward H. Sipe	....do	p. d. 4 50	Apr. —, 1857	....do	
W. H. Davis	....do	p. d. 4 25	Nov. 1, 1861	....do	
Theodore Wasserbach	....do	p. d. 3 65	July 5, 1878	New York	
A. C. Ruebsam	....do	p. d. 1 60	July 15, 1880	District of Columbia	
J. Enthoffer	Contract ....do	2,000 00		....do	
H. C. Evans		1,800 00		....do	
R. F. Bartle		1,500 00		Virginia	
F. Courtenay		1,200 00		District of Columbia	
F. W. Benner		1,200 00		....do	
John H. Smoot	Writer	1,200 00	June 1, 1878	Minnesota	
A. Zumbrock	Electrotyper	2,000 00	Feb. 1, 1863	Pennsylvania	
Frank Over	Helper	p. d. 3 50	Feb. 1, 1864	District of Columbia Colored	
M. W. Wines	In charge miscellaneous division	1,700 00	Mar. 13, 1877	Ohio	United States Army, Dec., 1864, to Nov., 1865.
N. Y. Cavitt	Janitor	1,200 00	Jan. 1, 1879	Tennessee	
G. N. Saegmuller	Chief mechanician	1,700 00	July 1, 1873	District of Columbia	
John Clark	Instrument maker	p. d. 5 00	Jan. 20, 1870	....do	
Werner Suess	....do	p. d. 4 00	Apr. 1, 1872	....do	United States Army, in 1861 and 1862, and in 1864 and 1865.
E. Eshleman	....do	p. d. 3 50	Sept. —, 1867	....do	
P. Vierbuchen	....do	p. d. 3 50	Dec. 1, 1853	....do	
Louis Fischer	....do	p. d. 1 25	July 1, 1879	District of Columbia	
Thomas McDonnell	Chart room	1,600 00	July 2, 1833	....do	
G. A. Stewart	Archives	1,500 00	Mar. 16, 1874	Iowa	United States Army, Apr., 1861, to June, 1864.
C. Abert	Writer	p. m. 75 00	June 1, 1875	Maryland	
George A. Morrison	....do	p. m. 70 00	July 16, 1868	District of Columbia	
Frank Moore	Copper-plate printer	p. d. 5 25	July 1, 1873	....do	
D. N. Hoover	....do	p. d. 4 00	Aug. 1, 1875	....do	
James Beck	....do	p. d. 3 50	July 1, 1878	California	
James L. Smith	....do	p. d. 3 50	June 8, 1880	New York	
W. H. Grabenhorst	....do	p. d. 2 00	Aug. 10, 1880	District of Columbia	
John W. Reed	Laborer	p. d. 1 50	Nov. 1, 1878	....do Colored	
A. Yeatman	Carpenter	p. d. 5 00	Apr. —, 1852	....do	
George W. Clarvoe	Laborer	p. d. 1 25	Jan. —, 1879	....do	
H. Nissen	Map-mounter	p. d. 3 75	Aug. —, 1866	....do	
R. T. Bassett	....do	p. m. 65 00	May —, 1857	....do	
W. H. Butler	Messenger	p. d. 2 40	May 1, 1867	Maryland Colored	United States Navy, 1863 to 1868.
Edward L. Savoy	....do	p. d. 2 30	May 1, 1878	District of Columbia ....do	
William Young	....do	p. d. 2 25	May 1, 1861	....do ....do	
Charles Over	....do	p. d. 2 25	Apr. 1, 1862	....do ....do	

COAST AND GEODETIC SURVEY—Continued.

Name.	Grade.	Compensation.	Date of appointment.	State to which charged.	Color.	War record.
Henry McKenzie	Messenger	p. d. $2 00	Dec. —, 1872	District of Columbia	Colored	
Charles W. Jones	do	p. d. 2 25	Aug. 1, 1879	do	do	
William B. Ingram	do	p. d. 1 00	Feb. 3, 1846	do	do	
A. C. Whitney	Watchman	p. d. 2 45	Apr. 1, 1871	New York		United States Army, Oct., 1861, to Nov., 1862.
H. W. Huber	do	p. d. 2 45	Nov. 1, 1878	Ohio		United States Navy, Nov., 1863, to May, 1865.
John Warren	do	p. d. 2 00	Nov. 30, 1880	Pennsylvania		
S. E. Flynn	Laborer	p. d. 1 00	Nov. 1, 1872	District of Columbia		
Horace Dyer	do	p. d. 1 75	Dec. 1, 1873	Maryland	Colored	
Richard Waters	Fireman	p. d. 2 00	Oct. —, 1873	District of Columbia	do	
Sandy Bruce	do	p. d. 1 75	Nov. 25, 1880	do	do	
Hazzard McCoy	Driver	p. m. 65 00	Apr. 1, 1874	do	do	United States Navy, Mar., 1861, to July, 1865.
E. H. Courtenay	Publishing results	1,750 00	Jan. 1, 1862	Maryland		United States Navy, in 1862 and 1863.
William Ferrell	do	1,400 00	July 1, 1867	Massachusetts		
C. B. Turnbull	do	p. m. 60 00	July 1, 1878	District of Columbia		
Lucetta J. Ferrell	do	p. m. 45 00	Apr. 1, 1876	Kansas		
R. M. Harvey	Copyist	p. m. 70 00	June 28, 1878	Louisiana		
Miss C. L. Walker	do	p. m. 60 00	Apr. 1, 1880	District of Columbia		
Mrs. C. L. Barton	Copyist	p. m. 60 00	Sept. 9, 1878	Nebraska		
Miss J. Martin	do	p. m. 45 00	June 28, 1878	District of Columbia		
Miss S. C. Ayers	do	p. m. 45 00	July 1, 1879	Massachusetts		
Mrs. H. R. De Ronceray	do	p. m. 35 00	July 1, 1880	District of Columbia		
H. F. Walling	Map compiler	p. m. 150 00	May 16, 1878	Massachusetts		
Bion Bradbury, jr	Extra observer	p. m. 75 00	June 28, 1870	Maine		
John B. Boutelle	do	p. m. 100 00	Oct. —, 1870	Virginia		
William B. Fairfield	do	p. m. 100 00	Sept. 1, 1872	Maine		
James J. Clark	Adjuster	p. d. 5 00	Mar. —, 1870	Pennsylvania		
E. B. Lefavour	Verifier	p. d. 3 50	Feb. 2, 1881	Massachusetts		
W. M. Long	Watchman	p. d. 2 45	Sept. —, 1876	Pennsylvania		126th Pennsylvania Volunteers, April, 1862, to January, 1863; wagon master January, 1863, to January, 1866.
M. Lauxman	Laborer	p. d. 1 00	July 1, 1868	District of Columbia		

NOTES.

I. *Color.*—The uniform practice in the Coast Survey is to employ none but colored men as messengers and laborers. The technical character of the work has hitherto prevented their employment in other branches of the establishment.

II. *War record.*—The war record of officers of the Coast Survey is given in the briefest possible form. Most of them were detailed to serve as engineer staff officers with the various squadrons and Army corps without being regularly enlisted in the service.

SECRET SERVICE DIVISION.

Name.	Grade.	Compensation.	Date of appointment.	State to which charged.	Color.	War record.
James J. Brooks	Chief	$3,500 00	Oct. 8, 1874	Pennsylvania	White	
Roscoe W. Gage	Chief clerk	2,000 00	Jan. 10, 1876	Maine	do	
John G. Cowie	Financial clerk	1,800 00	Sept. 14, 1874	Iowa	do	
Lorenzo D. Harmon	Second-class clerk	1,400 00	Oct. 16, 1876	Virginia	do	
Harry J. Douglas	do	1,400 00	Jan. 1, 1879	Texas	do	Two and one-half years United States Navy; one and one-half years United States Army.
George A. Rock	do	1,400 00	Jan. 28, 1871	District of Columbia	do	
Charles Miller	Clerk	1,100 00	Oct. 5, 1874	Pennsylvania	do	

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47TH CONGRESS, 1st Session. } SENATE. { EX. DOC. No. 9.

LETTER

FROM

THE SECRETARY OF THE NAVY,

TRANSMITTING

Information, in compliance with Senate resolution of April 12, 1881, *relative to alteration, if any, in the relative rank of graduates of the Naval Academy as originally established under the provisions of sections* 1483 *and* 1521 *of the Revised Statutes, &c.*

DECEMBER 13, 1881.—Referred to the Committee on Naval Affairs and ordered to be printed.

NAVY DEPARTMENT,
Washington, December 12, 1881.

SIR: I have the honor to submit the following information in compliance with a resolution of the Senate, dated the 12th of April last, directing "the Secretary of the Navy to inform the Senate what alteration, if any, has been made in the relative rank of graduates of the Naval Academy as originally established at graduation under the provisions of sections 1483 and 1521 of the Revised Statutes in any classes graduating since the year 1870; and, if so, under the provisions of what act the said alteration or rearrangement of rank was made."

The provisional relative rank assigned to midshipmen or cadets at the conclusion of the course of instruction at the Naval Academy, and held by them during the required term of probationary service at sea, as well as the relative rank established upon their final graduating examination, has been determined under rules prescribed by the Regulations of the Naval Academy. These Regulations are issued by the Secretary of the Navy, under authority of section 1547 of the Revised Statutes; and among the Regulations in force at the date of the passage of the statutes referred to in the resolution are the following:

CHAPTER 7.—*Merit-rolls.*

At the final academic examination the academic board shall make up the graduating merit-roll for this class, by adding the numbers which each member of the class shall have received on the several general merit-rolls for the four years, and arranging the order of numbers according to the aggregates, placing the highest first. * *

CHAPTER 8.—*Final examination of midshipmen before promotion.*

1. A board, to consist of five officers not below the grade of commander, one or more of whom shall be of higher rank than captain, and one a chief engineer, will convene at such times as the Secretary of the Navy may direct for the purpose of making the final examination of midshipmen, to ascertain and decide upon their qualifications for promotion.

2. To insure uniformity and justice, the final examination of midshipmen for pro-

motion, after completing their sea-service, shall take place at the Naval Academy, and the heads of departments shall, as required by the board of examiners, be present and assist at such examination.

3. As many of the same class of midshipmen who have performed the required sea-service as can be conveniently assembled will be ordered before the same board for their final examination for promotion to the grade of ensign. * * *

4. * * * In the vessels to which they may be ordered for sea-service they shall be required to learn the duties of officers in charge of a deck; engineers in charge of fire-rooms and engines; mates of the forecastle, lower decks and holds; and quarter-deck midshipmen. * * * They shall also be required to perfect themselves in the French and Spanish languages during the cruise.

5. The midshipmen shall produce certificates from the commander of their good conduct and attention to duty, together with journals of the cruise, watch, quarter, and station bills, and a book in which they shall make all calculations connected with the navigation of the vessel.

6. The examination by the board will embrace seamanship and naval tactics, practical gunnery, navigation, the management of steam-engines, the French and Spanish languages, and the standing in these branches shall be combined to determine the relative merits of the members of the class at this examination.

7. In assigning numbers to midshipmen on their final examination for promotion to the grade of master, the number 501 is to be considered as expressing the maximum, and 167 as the minimum to be allowed; and the board will assign to such midshipmen as shall, in its opinion, be duly qualified for promotion, the number within those limits, which, in the judgment of the board, will fairly express their relative qualifications.

8. The number thus assigned, when added to the numbers which have already been assigned to them respectively on the graduating merit-roll of the Naval Academy, will determine their standing as ensigns; the highest number to take precedence.

9. The Secretary of the Navy will cause the board of examiners to be furnished with the numbers which have been assigned by the academic board to each of the midshipmen, to enable the board of examiners to determine the relative standing of those whom they may examine, as required in the next preceding article.

Upon the completion of the prescribed course of study (four years) at the Academy by the cadets referred to who entered that institution prior to the year 1873, a merit-roll for each of the graduating classes was made up, in conformity with the regulations, by the academic board, from the several general merit-rolls for the four years, arranging the order of numbers according to the aggregates, placing the highest first. These classes were then sent to sea as midshipmen with the provisional relative rank thus determined, which rank was held by them during their probationary course of instruction on shipboard and until their final graduating examination.

At the expiration of the required term of sea-service, the several classes were returned to the Naval Academy for the final examination before promotion, which embraced seamanship, naval tactics, practical gunnery, navigation, &c.; their relative rank was then ascertained and fixed in accordance with the rules prescribed in chapter 8 of the Regulations, and they were, in that order, promoted to the grade of ensign.

I deem it proper to state, that prior to the act of Congress of March 3, 1873 (section 1520 Revised Statutes), the entire course of instruction for midshipmen or students consisted of four annual terms of study at the Naval Academy, and from one to two years' instruction in practical seamanship, &c., on shipboard, the naval regulations requiring sea-service before their promotion to the grade of ensign. By that statute the academic course of cadet-midshipmen was fixed at six years, which period includes the requisite sea-service; and all classes which have entered the Academy since the passage of that act have been required to pursue four annual terms of study there, and to perform two years' sea-service in other than practice ships. At the conclusion of this course the classes have been returned to the Naval Academy for final graduating examination, and, with the relative rank then determined,

they were appointed midshipmen, and, as vacancies occur, they are promoted to the grade of ensign.

The classes which entered the Naval Academy before 1873ha ve been promoted, with the advice and consent of the Senate, in the order of relative rank established and assigned them upon their final graduating examination; and no alteration or rearrangement has been made in the relative rank, as determined and fixed at that examination, of any of the classes graduating from the Naval Academy since the year 1870.

Questions arising in this department in relation to the examinations described and to the manner of determining the relative rank of graduates of the Naval Academy, under the regulations of that institution, have from time to time been presented to the Attorneys-General for consideration, and the practice pursued has been uniformly sustained. I respectfully refer to the following opinions upon these subjects.

In an opinion dated March 8, 1865, it was held that—

> Under the act of July 16, 1862, section 11, students or midshipmen at the Naval Academy are not entitled to be commissioned ensigns until they have performed the term of duty on shipboard prescribed by regulation of the department upon the completion of their academic studies, and passed their final examination on practical navigation and seamanship (11 Opinions, p. 158).

In regard to the relative rank of graduates of the Naval Academy, it was held August 7, 1877, that—

> The words "final graduating examination" in section 11 of the act of July 16, 1862, chapter 183, and "graduating examination" in section 12 of the act of July 15, 1870, chapter 295, signify that examination which, under the regulations of the Naval Academy, takes place after the prescribed term of sea-service has been performed. Assignments of relative rank, as between members of the same class based upon the results of such examination, are in conformity with law (15 Opinions, p. 637).

And, further, under date of March 31, 1879, the department was advised—

> That the construction given to the act of July 15, 1870 (chapter 295), at the Naval Academy, viz, that midshipmen, although graduates, were nevertheless not entirely emancipated from probationary study, but that after graduation they were still (as theretofore) to be students at sea, and that while so students at sea a provisional relative rank was asssigned them by the statute; but it was not intended by such legislation to abolish the old discipline, by which a final graduating examination was to have effect upon the relative rank which they should have after emancipation, be not disturbed. (16 Opinions, p. 296.)

I append to this communication a copy of each of the above-mentioned opinions, and respectfully refer to the opinion of the court in the case of Park Benjamin *vs.* United States (10 Court of Claims reports, 474).

Very respectfully,

ED. T. NICHOLS,
Acting Secretary of the Navy.

Hon. DAVID DAVIS,
President pro tempore of the Senate.

COMMISSION OF MIDSHIPMEN AS ENSIGNS.

Under the act of July 16, 1862, section 11, students or midshipmen at the Naval Academy are not entitled to be commissioned ensigns until they have performed the term of duty on shipboard prescribed by regulation of the department upon the completion of their academic studies and passed their final examination on practical navigation and seamanship.

ATTORNEY-GENERAL'S OFFICE,
March 8, 1865.

SIR: I have the honor to say, in reply to your letter of the 10th ultimo, that I am of opinion that the regulation of the department to which you refer, requiring the stu-

dents or midshipmen at the Naval Academy, after the completion of their purely academical studies, to perform a term of duty on shipboard, in order to acquaint themselves with practical navigation and seamanship, and under which their relative and respective ranks in the grade of ensigns is in part determined by the result of an examination on the subjects indicated after the completion of such term of duty on shipboard, is a perfectly valid regulation, as valid now as before July 16, 1862, and that students at the academy are not by law entitled to commissions as ensigns in the Navy until after they have passed the final examination imposed and directed by that regulation of the department.

The 11th section of the act of July 16, 1862 (12 Stats., 585), provides as follows: "That the students at the Naval Academy shall be styled midshipmen, and until their final graduating examination, when, if successful, they shall be commissioned ensigns, ranking according to merit." The statute, it will be perceived, does not prescribe rules for the organization and government of the academy, nor designate the subjects and methods of study to be pursued by the students, nor regulate the details of the academic curriculum. When the law went into effect there was in existence and operation a code of regulations framed and promulgated by the Secretary of the Navy, which made provision for the government and command of the institution, organized the professorial corps, established the academic board, prescribed the course of instruction in the various departments of study pursued at the institution, and regulated the different examinations, both intermediate and final, to which the students were subjected before completing their career in the academy and terminating their connection with the institution. The "final graduating examination," as determined and enforced by the regulations of the department, was that examination to which the members of the graduating class were subjected after they had performed a term of duty on shipboard, with a view to their becoming practically proficient in the arts of seamanship, naval tactics, gunnery, and navigation. The numbers assigned to them, respectively, by the examining board as the result of the examination on the subjects indicated, when added to the numbers which had previously been assigned to them on the "graduating merit-roll" of the academy, determined their respective standing as passed midshipmen, the highest number taking precedence. This last examination upon the subjects to which the service of the students on board of ship was especially directed after the completion of the more purely academical studies, was the "final graduating examination" under the system devised by the department.

Previously to that examination the students were regarded, speaking academically, as undergraduates. After they had passed this examination they became graduates of the institution, and took rank in the Navy conformably to their standing thus ascertained in the academy. Such was the system, so far as this matter is concerned, in operation at the naval school when the act of 1862 was passed.

The whole effect of the enactment in that part of the eleventh section of the statute, which I have quoted, is to entitle the students who may be successful at this final examination, or graduating examination, as it is treated in the regulations of the department, to commissions as ensigns in the Navy. The statute does not profess to change, nor can it be construed as changing, the system of study and discipline which the Secretary of the Navy had devised for the institution, and which was in full force and operation at the date of the statute. The statute simply determines the rank of the students in the Navy during their career in the institution, and declares their rank in the service after graduation. It provides that they shall be styled midshipmen before and until their final graduating examination, and that they shall be ensigns after that examination. But when that examination shall take place, under what circumstances the students shall be subjected to it, and to what topics it shall be directed, the statute does not undertake to determine. It leaves all such details to be governed henceforth, as they had been previously governed, by the code of regulations prescribed by the department. It must be assumed that Congress, when it made the law of 1862, had those regulations in mind. They were prescribed and enforced under its own authority, and so long as they were in operation, and remained unchanged by competent authority, they had, as Congress well knew, the efficiency of a statute. In legislating with precise reference to the "final graduating examination" at the academy, they gave, it may further be remarked, distinct legislative sanction to the regulation of the department by which that examination was appointed and under which it had been for many years enforced at the academy. If the question is asked, then, when an academic midshipman is entitled, under the act of 1862, to receive a commission as ensign in the Navy, no other answer can be given than this: After he shall have passed that examination which, by the regulation of the department, is established as the "final graduating examination" at the academy; and that examination, I understand, is the one which takes place after the graduating students have performed their prescribed term of duty on shipboard.

I am clearly of opinion, therefore, that the objection taken to the validity, since the enactment of 1862, of the regulation in question, is not sustainable; that the students or midshipmen at the Naval Academy are not in law entitled to promotion and

to be commissioned ensigns in the Navy immediately on concluding their academical studies, and that they are not entitled to receive commissions for that rank until after they have passed the final examination directed by the regulation of the department, with respect to which the present question has arisen.

I am, sir, very respectfully, your obedient servant,

JAMES SPEED.

Hon. GIDEON WELLES,
Secretary of the Navy.

GRADUATES OF NAVAL ACADEMY—RELATIVE RANK.

The words "final graduating examination," in section 11 of the act of July 16, 1862, chap. 183, and "graduating examination," in section 12 of the act of July 15, 1870, chap. 295, signify that examination which, under the regulations of the Naval Academy, takes place after the prescribed term of sea-service has been performed.

Assignments of relative rank, as between members of the same class, based upon the results of such examination, are in conformity with law.

DEPARTMENT OF JUSTICE,
August 7, 1877.

SIR: Herewith I submit to you replies to your communications of April 19 and May 23, addressed to the Attorney-General, in reference to to the cases of Ensign Qualtrough and Master Turner, and other gentlemen heretofore, respectively, their classmates at Annapolis, which cases, with some incidental differences, stand a good deal upon the same grounds of law. These cases are of more than usual interest and importance, for they involve questions of rank and precedence amongst members of a profession in which rank and precedence form high motives to heroism and self-devotion. The country calculates upon the existence and force of these motives. They are recognized and fostered both by the law and by public opinion. Therefore it is that public action tending to disappoint these motives, and consequently to impair their effect in general, must be treated as of universal concern; and any action duly arrainged upon such account must be subjected to more than ordinary scrutiny.

Master Turner's case depends in great degree upon the meaning of the words "*final graduating* examination" in the act of 1862, chap. 183, sec. 11, and Ensign Qualtrough's in the same degree upon the meaning of the phrase "*graduating* examination" in the act of 1870, chap. 295, sec. 12. The termination of Master Turner's four years' course at Annapolis—which termination he contends was his *graduation*—took place in 1869; Ensign Qualtrough's in 1871. The former, therefore, is not affected by the act of 1870, nor the latter by that of 1862, so far as this was superseded by that of 1870.

The complaint made by each gentleman, for himself and his associates, is that their *relative rank* in their respective classes has been fixed very much by the results of an examination ordered a year or more after that which they understand to have been their *graduation*, the above statutes of 1862 and 1870 having provided that such rank should be fixed at their "final graduating" examination, and at their "graduating" examination, respectively. This presents the ground of their complaint substantially, omitting for the present some matters which are incidental and will be mentioned again before I conclude.

Upon the other side the facts are admitted to be as above suggested; but it is contended that Congress used the words above quoted as they *generally* are at institutions of learning, and meant to designate the examination which uniformly, from the foundation of the academy, both by regulations and practice, had severed the connection of the student, as such, with the academy, excepting that in *practice* (only) for the years of the war, and the greater or less confusion which continued for several years thereafter—*i. e.*, from 1861 to 1869, inclusive—no competitive examination was had after students left the walls of Annapolis, and so their relative rank remained as then ascertained.

If the organization and discipline of the Naval Academy were in general a matter of *statutory* provision, it is probable that the present difficulties would not have arisen. Such statutory system might have provided a context explanatory of the words above quoted. As it is, however, the Naval Academy, whose existence is due to a wise act of mere departmental administration on the part of Secretary Bancroft in 1845, owes its organization substantially to *regulations* adopted from time to time by him and his successors. The above act of 1862 is the earliest legislation that concerns the interior management of the academy, and what has been since enacted touches that management only here and there incidentally. Inasmuch, therefore, as Congress has authorized the successive heads of the Navy Department to govern the academy by regulations, and has interfered therewith only, so to say, desultorily, the rule of statutory construction, which forbids any disturbance of previously existing statutory or common law by a new statute, further than is necessary to its reasonable operation, must be

applied here so as to prevent any unnecessary disturbance of previously existing *regulations*.

Upon examining some dozen editions thereof, running from 1847 to 1876, I find it to be true that, according to the regulations, *sea-service* for several years (and "other than in practice-ships") has uniformly been a part of the academic course at the Naval Academy since its establishment until now. The only editions in which that service is not expressly mentioned are those of 1851 and 1876, and I am told that these were not intended to, and, as a matter of fact, did not change the routine previously existing. I am not called upon to argue the propriety of such a regulation; it is enough for me in my place to know that it has existed. Leaving out the exceptional period above mentioned (1861–1869), this regulation, so far as I am informed, has also always been *executed*.

Naval education before the establishment of the academy was, of course, obtained in great measure whilst the student (midshipman) was undergoing sea-service. The earliest appointees to the academy (I do not speak of the midshipmen who were at first *collected* from service and sent thither), which appointees were designated *acting* midshipmen, after a partial course on shore were sent to sea for several years, and then returned to Annapolis and finished their studies there. These appointees at the close of the *earlier* course on shore received a certificate which testified to their fitness to go to sea; and before the end of their sea-service they became midshipmen, continuing, however, to be students of the academy. Subsequently (1851) the *two* previous courses *on shore* pursued by appointees to the academy, one before and the other after sea-service, were consolidated into a single term of four years preliminary to sea-service. This system has continued in existence ever since; the above act of 1862 in the mean time requiring students to be styled midshipmen throughout the whole course, and this style having been again changed to that of cadet-midshipmen by the above act of 1870.

In the regulations approved August 28, 1846, it is stated that the partial course therein required from acting midshipmen before being sent to sea was (article 12) "to ascertain whether their qualifications and deportment are calculated to reflect credit upon the Navy," and the "plan of the naval school" of same date shows (paragraph 7) that the determination of that question was referred to the superintendent and academic board, and that the practical result of their approbation was that the acting midshipman was "retained in the service and sent to sea." See, also, regulations of 1850, p. 6 (2).

I apprehend that this regulation presents the germ of the idea that the approbation of the superintendent and academic board given at the end of the four years' course on shore should be *graduation*, and their certificate thereof a *diploma*. The regulations of 1850 which precede the consolidation of the two courses on shore speak (chap. 9, sect. 2) of *the successful determination of the whole course, including sea-service*, as *graduation;* but those of 1851, which effected that consolidation, and which, as I have said, are silent as to sea-service, first use the word *graduate* in the peculiar sense which prevails at Annapolis, applying it to an academic act *during*, not at the end of, the academic course, *i. e.*, to an act which originally was intended to certify that the student might well be "sent to sea." At all events, since 1851 *graduation* is used in the above local and peculiar sense at the Naval Academy. The regulations subsequent to 1851 (except those of 1876) upon their face restore-sea service *after* graduation *as a part of the academic course*, and that since those of 1876 sea-service continues to be a part of the course is evident by comparing the definition of cadet-midshipmen in theact of 1870, chap. 95, with the provisions of the act of 1877, chap. 111, such comparison showing that "cadet-midshipmen" (which is, being translated, "students at the Naval Academy"), "*during such period of their course of instruction as they shall be at sea in other than practice-ships*, shall receive as annual pay not exeeeding $950." (19 Stats., p. 390, 2d par.)

By the above-cited plan of the naval school (par. 9.), the examination at the end of the whole course, including sea-service, was called the "*final examination*," and upon the face of all the regulations since that time (excepting, as above, those of 1851 and 1876) the results of this examination have entered as an important element into the determination of the *relative rank* of classmates.

It follows, therefore, that in the academic vocabulary at Annapolis the adjectives "final" and "graduating" in connection with "examination" have a technical meaning; that of the former (whilst not substantially differing from its usual sense) corresponding with *graduating* as ordinarily employed at institutions of learning, and that of the latter differing materially from its common acceptation, being no more *graduating*, as usually understood, than the *diploma* then given is a diploma as usually understood. After "graduation," in the local sense, the academic course at Annapolis runs on in another sphere, and the sum total of the study and discipline to which the acting or cadet-midshipmen (*i. e.*, students at the academy) have been subjected whilst under tutors and governors summed up into one grand result at the final examination, the list is made out, and then they cease to "be students."

I have hitherto been speaking, of course, without reference to the effect of the statutes

above cited, or to that of any possible *usage* at the academy contradictory to the face of the regulations.

I now turn to consider these, and first the statutes.

The act of 1862, chap. 185, sec. 11 (12 Stats., 585), so far as important here, is as follows: "That the students at the Naval Academy shall be styled cadet-midshipmen, until their final graduating examination, when, if successful, they shall be commissioned ensigns, ranking according to merit."

In light of the fact that at the academy there were two examinations, one graduating, the other final, I think that this act does not change the system previously existing. Whether we take the adjectives in their *common* or in their *local* sense, the result is the same; in the former sense they mean the graduating examination as ordinarily understood at institutions of learning; in the latter sense there is such a contradiction of meaning that they must be without effect to disturb the law as existing previously. In this sense they refer as clearly to the "final" as to the "graduating" examination, and of course must be imperative to attach to the "graduating" examination that which till then had been an incident of the "final" examination.

2d. I also submit that the *usage* from 1861 to 1869 does not vary the state of Master Turner's claim. Usage during war contradictory to written law amounts, of course, to nothing. Professor Soley's History of the Academy refreshes the recollection as to the confusion at the academy during that time. Nor can I think that usage for the first four years after the war (when *usage* in most respects, especially concerning military matters, had hardly subsided within its *banks*) can have such effect, especially as all the while the published regulations duly reminded both authorities and students at the academy that such usage was abnormal.

In this immediate connection a very singular circumstance may be noticed: The act of 1862 provides that the "final graduating examination" shall determine both *rank* and *promotion*. In 1864 the Secretary of the Navy asked the Attorney-General whether for the purposes of *promotion* (the question did not extend to *rank*) the examination so designated was the *final* or the *graduating* examination, as understood at Annapolis. The Attorney-General answered that the act meant thus to designate the *final* examination. (11 Opin., 158.) Accordingly the act afterwards practically received this construction for *promotion*, but the obvious conclusion as to *relative rank* also was not drawn until after 1869. The practical construction of the statute has therefore been self-contradictory, and upon this account, if upon no other, must be without effect to control the obvious meaning of the words in which the statute is clothed.

I come now to consider the provisions of the act of 1870, chap. 295, sec. 12, cited on behalf of Ensign Qualtrough and his associates. These are as follows:

"That the students in the Naval Academy shall hereafter be styled cadet-midshipmen. * * * When cadet-midshipmen shall have passed successfully the graduating examination at said academy they shall receive appointments as midshipmen, ranking according to merit, and may be promoted to the grade of ensign, as vacancies in the number allowed by law in that grade may occur." (16 Stat., 334.)

There is nothing in the title of the act from which this passage is taken (an act making *appropriations* &c.) to throw light upon the question before me. However, among its provisions other than those making appropriations is one (sec. 10) reducing the number of ensigns in the Navy to one hundred. By the act of 1862, quoted from above, their number had been 144, and by an act of 1866 (14 stats., 222), then in force, it had been increased to 160. As the act of 1870 so much diminished the number of ensigns, it was probably thought that it should also alter the provision above quoted from the act of 1862, making all graduates ensigns; for a provision fixing the number of ensigns in time of peace at one hundred was inconsistent with a provision that all who passed the final graduating examination at the Naval Academy (that is perhaps fifty or more per year) should *ipso facto* become ensigns. It was therefore determined to reduce the grade of students at Annapolis, and consequently of graduates also, by *one degree*, and provide that graduates ("midshipmen") should be promoted to ensigns thereafter as vacancies might occur.

It is true that this may not have been the whole of the mischief intended to be remedied by the words above quoted. But at all events, it was a mischief then fresh, and certainly also provided for. The precise and complete manner in which that mischief is implied and is provided for contrasts strongly with what is suggested to have been further intended in using the word *graduating*. For in the latter case a matter is conjectured to have been regarded by Congress as a *mischief* as the consequence of a *further conjecture* that Congress used a word in another than its usual and popular sense. There is no evidence that Congress regarded the regulations giving promotion and relative rank at Annapolis as mischievous other than the imputation that it has used the word graduating in the local and very special sense prevailing at Annapolis.

The emphatic parts of the provision seem to me to be those as to reduction of grade and the method of promotion to ensign; the other parts being merely cursory and the objects of only partial attention.

But even in the absence of the illustration in the very section before us that Con-

gress was not then inadvertent to the rule that *mischiefs* should be declared or clearly implied in a statute which represses them, I should be disposed to question as somewhat strained and unreasonable the proposition that this statute indicates that Congress regarded the regulations at Annapolis upon promotion and relative rank as mischiefs requiring to be overruled. For in determining the meaning of the word "graduating" in this act, we are shut up to the following alternatives: (1) Congress used the word in the local sense peculiar to Annapolis, and thereby cut off acquisitions during sea service from the academic course of study and from effect upon relative rank; or (2) Congress used the word in its ordinary and popular sense, and so left the academic course and the elements entering into relative rank undisturbed.

I find great difficulty in concluding that Congress, which has (otherwise than here) uniformly abstained from prescribing the academic course at Annapolis, and has (I may say) *wisely* left to the suggestions of professional experts, made through the Secretary of the Navy, the determination of what studies best tend to produce accomplished naval officers, and also the character of the elements which ought to establish relative merit (and so relative *rank*) amongst classmates, is to be supposed, from the use of a single *ambiguous* word, to have made a revolution in this general policy and practice.

It may be said that inasmuch as the statute under consideration exclusively concerned an institution which used *graduate* in a special sense, the rule that Congress generally employs words in their peculiar meaning must give way to the rule that laws are to be interpreted according to their subject-matter. It is true that none of the cases in the Supreme Court of the United States which illustrate the rule for the interpretation of words that have two meanings, one technical, the other general, are upon all-fours with the present, but a recent case in the English court of exchequer seems to me to be entirely so. The instrument there before the court was a policy of insurance. It is needless to say that the rules for interpreting contracts and statutes are very much the same. The policy was upon certain premises, the business carried on in which necessarily disengaged large quantities of a highly inflammable and explosive vapor. In this state of things the policy contained the following clause: "Neither will the company be responsible for loss or damage by explosion, *except* for such loss or damage as shall arise from explosion by gas." The vapor on the premises (gas), having caught fire, caused a destructive explosion, and a suit was brought to recover damages.

It seems that in such a case, if in any, it might well have been said that the policy was to be explained by its subject-matter, viz, a business producing a *peculiar* vapor or gas, and so covered, amongst others, any explosion caused as above. But the court (Kelly, Martin, and Channell) were unanimous in saying that "gas" was to be taken in its *ordinary and popular sense*, and so meant only illuminating gas. (Stanly *vs.* Ins. Co., L. R., 3 Exch., 71.)

The mere fact, therefore, that the act of 1870 concerned an institution at which *graduating* has a *peculiar* meaning, does not make it an exception to the rule requiring that word to be taken in its *usual* meaning.

To these observations upon the construction of the act of 1870 is to be added the remark, that, although Congress has not since modified its provision which makes *graduation* the event which changes grade and fixes relative rank, yet by the act of 1877, chap. 111, as we have already seen, sea service, "other than in practice ships," is referred to as being at present a part of the "course of instruction" at Annapolis, and as occurring before a change of grade on the part of the students: That cadet-midshipmen, during such period of their course of instruction as they shall be at sea in other than practice ships, shall each receive as annual pay not exceeding nine hundred and fifty dollars (19 Stats., 390). It should be observed that this is only a statutory *reference* to the circumstance, and *not a positive enactment*, that "students at the Naval Academy" during a part of their "academic course" (act of 1873, chap. 230) are *at sea*. It therefore occurs to ask, by what *previous* provision of law then in force did sea service become a part of that course? The act of 1873, which fixed the "academic course" at *six years*, does not answer this question, except, perhaps, by way of further reference to antecedent *regulations*. Indeed, it cannot answer the question in any sense, if it be true that an act in force at the time of its enactment (*i. e.*, the act of 1870, chap. 295, which in 1873 was the last preceding statute upon the subject) did substantially, as suggested by Ensign Qualtrough, blot sea service from the academic course. For the mere lengthening of the academic course in 1873 cannot, of itself, be construed as changing graduation from *before* to *after* sea service; and in the mean time, as we have seen, the regulations of 1870 had *dropped* the reference to sea service, which previous regulations had made so uniformly. It seems to me, therefore, that the interpretation suggested by Ensign Qualtrough for the act of 1870 is contradictory to what the act of 1877 shows Congress understood to have been the state of the law at that time.

As another consideration to the same effect, I remark that Congress has acquiesced in the construction which the academic authorities have given to this act as well as to that of 1862. The weight to be attributed to this acquiescence may be ascertained

by observing that the object of the acts was of great public as well as of great private interest. Legislation upon private rights may well be left to litigation between those interested, and thereupon to the construction of the courts, but legislative determination of what the public requires in regard to candidates for high places in the Navy is obviously so far a different thing, that gross errors in those who administer it are not to be left uncorrected by the authors of this rule. Such errors would, no doubt, receive early attention and rectification by Congress, in the interests of the public, probably as to the actual decision, and certainly to govern future cases.

If members of the classes of 1869 and 1871 have any legal ground for complaint, so also those of the classes of 1870 and 1872 and every succeeding year; for, plainly, any officer of the class of 1870 or 1872, who has had that which would have been his standing by *ante-sea-service* record reduced by the effect of the *final* examination, may claim the protection of the acts of 1862 and 1870 as completely as may members of the class of 1869. It is true for both, or for neither, that the *final* examination had no legal effect upon relative rank.

At the beginning of this opinion I have alluded to some *incidents* connected with the manner in which the class of 1869 were ordered to the final competitive examination that have been complained of by Master Turner and his associates. Upon consideration I am of opinion that, whatever else may be thought of them, they do not affect the questions of *law* before me. Of these are the circumstances, (1) that whereas the classes immediately preceding had not, during eight years, been subjected to a competitive examination after "graduating" (in the local sense), the class of 1869, after having left Annapolis and been at sea for a year or so, without previous notice were ordered to undergo such an examination; (2) that the *value* in former years assigned to this examination in fixing rank was, without notice, as above, greatly increased; and (3) that the class was not examined in one body but in separate sections, at times separated by more than a year.

The first of these circumstances is one to be regretted. Notice should have been given before graduation. Yet it is remarkable that the language of the regulations then in force, which contemplated a "final" competitive examination, did not in fact put any of the students upon inquiry as to the foundation of the practice prevailing immediately before. In any event, although the incident is disagreeable, it does not affect the lawfulness of the order.

The second circumstance is perhaps still more to be regretted. There was nothing in the regulations to give notice of the extraordinary effect upon rank thus assigned to the final examination. But the order herein was not plainly beyond the Secretary's *power*, and therefore I cannot advise that this detail therein regulated should be corrected.

The last circumstance is an imperfection as to the practical working of the "final" examination which is referred to in the regulations as unavoidable, and yet as insufficient to nullify other advantages arising from that requirement. It of course affects alike all such ever held at Annapolis. It cannot be considered to render them illegal. Upon the whole, therefore, I have to advise you that the assignments of relative rank heretofore made in the cases both of Master Turner and of Ensign Qualtrough and their associates ought not to be disturbed.

With high respect, your obedient servant,

S. F. PHILLIPS,
Solicitor-General.

The SECRETARY OF THE NAVY.

Approved.

CHAS. DEVENS.

GRADUATES OF NAVAL ACADEMY—RELATIVE RANK.

Opinion of August 7, 1877 (15 Opin., 637), in the cases of Ensign Qualtrough, Master Turner, and others, of the Navy, involving the question of relative rank among graduates of the Naval Academy, as between members of the same class, reaffirmed.

Advised, that the construction given to the act of July 15, 1870, chap. 295, at the Naval Academy—viz, that midshipmen, although graduates, were nevertheless not entirely emancipated from probationary study, but that after graduation they were still, as theretofore, to be students at sea, and that, while so students at sea, a provisional relative rank was assigned them by the statute, but it was not intended by such legislation to abolish the old discipline by which a final graduating examination was to have effect upon the relative rank which they should have after emancipation—be not disturbed.

DEPARTMENT OF JUSTICE,
March 31, 1879.

SIR: Your communication of the 28th of January, 1878, inclosing a copy of a letter addressed to you on the —— of the same month by Lieut. W. H. Turner, together with the printed argument which accompanied it, has been received.

The cases of Messrs. Turner, Qualtrough, and others, of the Navy, have again been attentively considered, in connection with these papers and the arguments presented by the counsel for these officers.

I see no reasons for changing the conclusions previously announced by this department upon this subject, or for restating in full the argument by which they are sustained.

I call attention briefly, however, to two or three circumstances which seem to be considered by the memorialists worthy of examination.

First. The fact that the nominations to the Senate were made and ratified by lists, which gave to each name the number assigned to the student at the close of the academic examination is deprived of weight by the circumstance (admitted by the claimants) that such nominations were expressly so made upon conditions subsequent, and, as I learn from the Navy Department, such conditions have been inserted in like nominations ever since 1862, and, for such nominees, have been uniformly interpreted as including the effect of all future examinations, whether competitive in their character or merely for promotion.

Second. Mr. Qualtrough's complaint, in substance, is that—the statute of 1870 (in force at the time of his graduation) requiring that students at the Naval Academy should be called cadet-midshipmen, and that after graduation they should become midshipmen with the relative rank established at graduation, and thereafter should be promoted ensigns as vacancies might occur—at a certain period of his academic career he was by the authorities declared a midshipman with a certain relative rank, and was treated as such, but that some year or more afterwards, previously to promotion, he was subjected to a competitive examination, lowered in rank and promoted, and still considered of such lower rank.

The construction given to the statute of 1870 by the authorities at the academy has been that midshipmen, although graduates, were nevertheless not entirely emancipated from probationary study, but that after "graduation" they were still (as theretofore) to be students at sea; that while so students at sea a provisional relative rank was assigned them by the statute, but that it was not intended by such legislation to abolish the old discipline by which a final graduating examination was to have effect upon the relative rank which they should bear after emancipation.

I see no reason for disturbing this conclusion by whatever course of argument it may be attempted to be met. Honorable and very intelligent gentlemen, alive to the interests of their profession, entirely impartial, no doubt privy to the adoption of the legislation in question, and required by their official duties to administer it, have decided, upon a perusal of the context of this statute, in connection with previous legislation and regulations, that it was not intended thereby to abolish a principal feature in the course of probationary instruction, to wit, sea-service. No mere doubts upon the legal question thereby presented would justify a reversal of that opinion here; and there does not seem to me to be any necessity for rediscussing the general topic.

If the will of Congress was mistaken upon this point, the character of that mistake rendered it proper to apply to that body for relief. In the former opinion the circumstance that such application had been made without success was alluded to as showing an acquiescence by Congress in the ruling of the academic authorities.

I mention this because it would seem, from a brief filed in the case of the present application, that the scope of that allusion was misunderstood by the memorialists.

Very respectfully, your obedient servant,

CHAS. DEVENS,

Hon. R. W. THOMPSON,
Secretary of the Navy.

47TH CONGRESS, 1st Session. } SENATE. { EX. DOC. No. 10.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING,

In compliance with law, a progress report of the Mississippi River Commission, dated November 25, 1881.

DECEMBER 15, 1881.—Ordered to lie on the table and be printed.

WAR DEPARTMENT,
Washington City, December 14, 1881.

SIR: As required by the act of Congress approved June 28, 1879, providing for the appointment of the Mississippi River Commission, I have the honor to transmit herewith a progress report of said Commission, dated November 25, 1881, and to respectfully recommend that the same be printed.

Very respectfully, your obedient servant,

ROBERT T. LINCOLN,
Secretary of War.

The PRESIDENT *pro tempore*
of the United States Senate.

OFFICE OF THE MISSISSIPPI RIVER COMMISSION,
Saint Louis, Mo., November 25, 1881.

SIR: The Mississippi River Commission have the honor to submit the following report, embracing the subjects and subdivisions specified below, to wit:

1. Progress of surveys and examinations since January 8, 1881; operations of a similar character contemplated under the existing appropriation, and estimate of funds for continuing this work during the next fiscal year.

2. Works of improvement contemplated under existing appropriation; preparations for executing the same, and estimate of funds for next fiscal year.

3. Remarks on the subjects of levees and outlets.

4. Discussion of the Red and Atchafalaya rivers.

5. A discussion of the flood on the Missouri River in April and May, 1881.

6. Remarks on the borings made at sundry points, and deductions therefrom.

7. Upon the mutual relations of river sections under varying conditions of discharge and curvature.
8. Remarks on Vicksburg Harbor and Bonnet Carré crevasse.
9. Works of improvement now in progress, under the Engineer Department, on that part of the river between the mouth of the Missouri River and Cairo.
10. Necessity of certain proposed legislation in the general interest of river improvement.

PROGRESS OF SURVEYS AND EXAMINATIONS.

The third section of the law organizing the Commission required it to—

> Direct and complete such surveys of said river between the Head of the Passes, near its mouth, to its headwaters as may now be in progress, and to make such additional surveys, examinations, and investigations, topographical, hydrographical, and hydrometrical, of said river and its tributaries as may be deemed necessary by said Commission to carry out the objects of this act.

The Commission, on January 8, 1881, reported the progress it had made in carrying out this provision of the law, and now reports the further progress made up to October 10, 1881.

In this period the triangulation of the river has been completed from Arkansas City, Ark., to Greenville, Miss., 38 miles distant, where it joins the Coast Survey triangulation, now complete from that point to the Gulf of Mexico. It has been completed between Thebes, Mo., and Cairo, a distance of 22 miles, and between Grafton, Ill., and Keokuk, Iowa, a distance of 166 miles; this latter chain depending on bases measured with a secondary base apparatus at Grafton, La., and Keokuk. Azimuth determinations were also made at these last points. The triangulation is accordingly now completed from Keokuk, Iowa, to the Gulf of Mexico.

The precise levels have closed a gap of six miles above Greenville, Miss. They have been completed from Neeley's Landing, Mo., to Cairo, a distance of 50 miles, and from Grafton to Keokuk, a distance of 150 miles.

The Coast and Geodetic Survey has made its line of precise levels continuous from Greenville to New Orleans; so that the precise levels are now complete between Keokuk, Iowa, and New Orleans.

A tide-gauge has been established in the Gulf of Mexico, at Biloxi, and the Superintendent of the Coast and Geodetic Survey has kindly offered to connect his line of precise levels along the Mississippi River with this tide-guage; so that within a year or two it is hoped to refer with precision all the levels along the Mississippi River to the mean level of the Gulf of Mexico as an origin.

The preliminary topography and the soundings have been carried from Walnut Bend, Ark., to Sunflower Landing, Miss., a distance of 70 miles, and a survey of Vicksburg Harbor has been completed.

The plotting of the topography and hydrography has been continued, twenty-six additional sheets having been plotted to a scale of $\frac{1}{10000}$.

The preparation of a preliminary chart of the river on a scale of $\frac{1}{63360}$, or one inch to a mile, has been begun, and four sheets, reaching from Cairo to Cottonwood Point, are completed.

The observation parties which were placed on the Upper Mississippi last fall at Prescott, Winona, Clayton, Hannibal, Grafton, and Saint Louis, have been maintained during the year, and were withdrawn about October 25. Aside from the information gained as to changes in the

bed of the river, and as to sediment, these observations will give, at short intervals during the year, the discharge at the respective stations and also the annual discharge.

A party, which at the date of the last report was engaged in determining the heights of high-water marks for the flood of 1880, has completed that work from Cairo to Fort Saint Philip, below New Orleans, and has determined the slopes of the river at low-water, from Cairo to Commerce, Miss., a distance of 300 miles.

In order to obtain more definite information as to the heights of the alluvial bottom lands of the Mississippi, and their reservoir capacity, a series of transverse level lines, running from ground above overflow on the east side of the river, to similar ground on the west side, has been undertaken. High-water on the bottom lands interfered seriously with the progress of this and of other work on the lower river during last spring.

The thanks of the Commission are due to the secretary of the Commission, who has had charge of the details of the surveys and examinations, and to the assistant engineers, by whom the work has been efficiently executed.

Details as to the work may be found in the secretary's reports of June 21, 1880, and July 6, 1881, appended hereto.

With the remainder of the present appropriation it is hoped during the coming year to complete the final topography and hydrography from Saint Louis Landing to Vicksburg; to complete the lines (nine in all) of levels across the alluvial bottom of the Mississippi River, and to keep gauging parties at Paducah and Columbus, Ky., Helena, Ark., Lake Providence, La., and the mouth of Red River, until next fall.

The following appendixes relating to the work of surveys and examinations are submitted:

Appendix A.—Annual report of the secretary of the Commission upon the field work of surveys.

Appendix B.—Report upon, and final results of, secondary triangulation from Cairo to Memphis.

Appendix C.—Report upon, and final results of, precise leveling from Columbus, Ky., to Memphis.

Appendix D.—Report upon observations at Plum Point from November, 1879, to November, 1880.

Appendix E.—High-water profile of the flood of March–April, 1880, from Cairo to Carrollton, with low-water profile of same year from Cairo to Commerce Cut-off (plate —). The diagram contains such high-water marks of previous years as can now be reliably determined.

FINANCIAL STATEMENT.

APPROPRIATION FOR MISSISSIPPI RIVER COMMISSION.

Balance December 11, 1880, as per statement accompanying report of January 8, 1881	$105,000 00
Amount appropriated by act Congress approved March 3, 1881	150,000 00
	255,000 00

Amount expended from December 11, 1880, to November 19, 1881, including outstanding liabilities:	
For surveys and observations, salaries of commissioners, mileage, and inspection, office and general expenses	144,000 00
Balance which it is estimated will be required during the remainder of fiscal year ending June 30, 1882	111,000 00
	255,000 00

ESTIMATE OF FUNDS FOR SALARIES AND EXPENSES OF THE COMMISSION FOR NEXT FISCAL YEAR.

To continue the "surveys of the Mississippi River between the Head of the Passes, near its mouth, and its headwaters, now in progress"; to make "additional surveys and examinations of said river and its tributaries"; to make such additional examinations and investigations, topographical, hydrographical, and hydrometrical, as are necessary for maturing a plan for the permanent improvement of the entire river; for salaries and expenses of the commission in traveling, mileage and inspection, for office expenses, computing, draughting, &c., and for publication of maps and results	$200,000 00
Details of estimate as follows:	
Salaries and traveling expenses of Commission, office expenses, and reduction of work	40,000 00
Continuation of surveys and gaugings of Mississippi River and its tributaries	140,000 00
Permanent gauge stations and borings	10,000 00
Publication of maps and results	10,000 00

WORKS OF IMPROVEMENT CONTEMPLATED UNDER EXISTING APPROPRIATION.

At the first meeting of the Commission subsequent to the adjournment of the last Congress the following communication was addressed to the honorable Secretary of War, containing in brief and general terms a project for expending the $1,000,000 appropriated by act approved March 3, 1881, for works of channel improvement recommended by the Commission:

SIR: By direction of the Mississippi River Commission, I beg leave to submit for your consideration the following project for the expenditure of the $1,000,000 appropriated by act approved March 3, 1881, for the improvement of the Mississippi River below Cairo, in accordance with the plan proposed therefor by the Commission.

After full consideration of the subject, the Commission have decided that it will be judicious to select two only of the six reaches of difficult navigation enumerated in their preliminary report.

They are of the opinion that better and more decisive results can be thus obtained than if partial works were undertaken on the entire number.

The reaches selected are designated in our preliminary report as the Plum Point and Lake Providence reaches.

The first lies between Cairo and Memphis, 145 miles below the former place. It extends from about the head of Island No. 26 to Randolph, or Second Chickasaw Bluffs, a distance of 38 miles. In this distance there are no less than seven shoal places, where the depth is liable to be less than the average on the bars in other portions of the river; the minimum depths reported being 4½ feet, while 5 and 6 feet are not uncommon.

The width throughout the greater portion of the reach is excessive, being for considerable distances as high as 10,000 feet. In other portions of the reach, characterized by great stability, the width is from 2,000 to 3,000 feet. In the wider portions the channels, at low-water, are not only very shoal, but also extremely changeable.

These various causes have made the reach the most troublesome to navigation of any on the river, and it has been selected for improvement on that ground.

The Lake Providence reach is 559 miles below Cairo. It extends from Skipwith's Landing, La., to the foot of Island No. 95, a distance of 25 miles. In this reach are found six shoal crossings which are all below the average depth, and on some of them depths as low as 4½ feet are occasionally found.

The width of river is from 5,000 to 10,000 feet. These are the lowest of the very bad shoals, and are very much in the way of the Lower River boats engaged in what is known as the "bends" trade, *i. e.*, the collection of cotton for the New Orleans market from points along the Mississippi below White River. The removal of the bars near Lake Providence would extend this trade at low-water nearly 200 miles.

In projecting improvements at these localities, the Commission have considered that a reduction of the width of the river by suitable works to a uniform low-water width of 3,000 feet would accomplish the results desired.

Upon the accompanying tracings they have laid down approximately the shore-lines which they propose for the regulated river.

The maps, however, were made several years ago, and changes are known to have occurred. It will therefore be essential, before definitely laying out the works, that a resurvey should be made.

It will also, doubtless, be necessary to modify the project during the progress of the works in order to meet changes in the regimen of the river that cannot be foreseen at present.

The plan submitted is, therefore, only an expression of our ideas as to the general points to be attained, or approximated to as nearly as possible.

The work proposed divides itself into two classes:

The first class embraces works designed to contract the river to the desired width, and maintain the regulated channel by building up banks where they do not now exist.

The second class embraces all the protective works designed to prevent encroachments by the river upon the existing banks or the new ones to be formed.

The first class of works will consist of cross and training dikes designed under what may be termed the permeable system; that is to say, they will not be solid structures, capable of deflecting the current, but will be so constructed that, by impeding the free flow of the water, its velocity will be so checked as to cause deposits around the dikes that will ultimately grow to such dimensions as to deflect the current as desired. In other words, the portions of the river-bed from which it is desired to exclude the water will be built up by deposits from the river itself until they form the new banks of the regulated river.

The precise nature of these constructions must be determined by experiment, but they will be of similar nature to the constructions successfully used on the Missouri and on the Mississippi, near Saint Louis and Memphis.

These consist essentially of anchored and buoyed screens of wire netting, wire and brush, and wattled hurdles of brush. In some instances these screens and hurdles have been supported by piling, or by other equivalent devices.

The protection works will consist of mattresses (composed mainly of brush) sunk against the bank to be protected. The manner of constructing these mattresses, their thickness and general dimensions, and the best combination of materials, must be determined by experiments. Similar constructions have been successfully used at many points along the Missouri and Mississippi.

Immediately above each of the locations selected for the inauguration of work there exist large outlets, discharging a great volume of water into the swamp reservoirs, when the river is at, or a little above, half-stage.

While the necessity of conserving the water thus diffusing and wasting itself into the swamps is recognized, it is, as yet, undecided whether the work should be done before or during the work heretofore described.

The Commission have confidence in the effectiveness of the systems of construction proposed, but the details are regarded as experimental, it being of the utmost importance to ascertain the cheapest constructions by which the desired results may be obtained.

In carrying on the work proposed it is thought that the bulk of materials required may be obtained by contract, and that the unskilled labor may be obtained in the same manner, the skilled labor being employed by the government. The government should own the working plant, and should work up and put in position the materials supplied. This is essential in experimental work, where constant changes in the systems of construction may be anticipated.

In carrying out the work under the existing appropriation, the Commission deem it of the utmost importance that there should be no failure to secure results due to lack of the necessary funds.

They therefore propose, if possible, to carry the improvement at Plum Point as nearly to completion as the duration of the working season will allow, the improvement at Lake Providence being simultaneously undertaken, but not necessarily throughout the whole extent.

The Commission, therefore, suggest as an approximate allotment of the appropriation, $600,000 to Plum Point and $400,000 to Lake Providence. As considerable time will be required to procure the necessary plant and make arrangements for beginning work, the Commission request that the appropriation be made available at once.

Q. A. GILLMORE,
Lieutenant-Colonel of Engineers, Bvt. Maj. Gen., U. S. A.,
President Mississippi River Commission.

ROBT. T. LINCOLN,
Secretary of War (through the Chief of Engineers), Washington, D. C.

The foregoing recommendations having received official sanction, steps were taken at the earliest practicable moment to prepare the equipment deemed necessary for an advantageous prosecution of the work. As the Commission had no suitable appliances whatever under its control for carrying on work, except what formed a small part of the moderate outfit required for conducting the surveys and examinations provided for

by a separate appropriation, the preparation involved the creation of an entirely new plant, and not in any sense the enlargement of an old one. The plant ordered by the Commission, while it has not been restricted to the smallest magnitude which might have sufficed for an economical expenditure of the existing appropriation, will need to be somewhat increased to meet the requirements of a vigorous and satisfactory execution of similar work in the future. So far as authorized, it comprises, among its principal articles, four barges for grading the banks, each equipped with a force-pump and necessary pipes and hose for delivering 2,000 gallons of water per minute under a high pressure; two mattress barges, fitted out with suitable wire-net weaving apparatus for the manufacture of wire-netting for permeable dikes and revetments; thirty pile-drivers; seventy-eight barges for the transportation of brush and stone; two large quarter-boats for offices and quarters for the superintending engineers, and for store-rooms and quarters and mess-rooms for skilled labor; two smaller quarter-boats for brush-cutting parties moving from place to place; five tow-boats of different sizes for towing stone and brush-barges and handling the same at the works; two steam-launches for the use of the superintending engineers and inspectors; portable quarters and mess-rooms for the accommodation of 500 common laborers; and moderate outfits for two blacksmith-shops and two carpenter-shops.

A large portion of this plant has been completed and delivered at the localities where it is to be used, and it is expected that operations will be fully under way before the close of the present year.

Work in the way of preparation, and consisting in the clearing of the banks which will first be protected, has already been begun.

Contracts at fair rates have been made for 425 tons of galvanized steel wire of suitable sizes, and for 20,000 cubic yards of riprap stone delivered to barges at the quarries. A portion of this material has been delivered.

No bids having been received in response to advertisement for furnishing, quartering, and subsisting the common laborers required on the works, the arrangements made have necessarily embraced these items of administration.

Capt. J. B. Quinn and Lieut. W. L. Marshall, both of the United States Corps of Engineers, who were detailed to disburse the moneys appropriated for works of construction, have been assigned to the immediate direction and charge of the work, the former to the Plum Point reach, above Memphis, and the latter to the Lake Providence reach, above Vicksburg.

It is the duty of the Commission, under the act approved March 3, 1881—

> To make report, on or before the first day of January next, to the Secretary of War, for transmission by him to Congress, of a detailed statement of the work done, and of the expenditure made from the sum hereby appropriated, with their judgment upon the effect of such work, and the general practicability and estimate of total cost of such improvements along said river from Cairo to the Head of the Passes.

In compliance with the foregoing requirements it is respectfully submitted that the delay has been so great in getting ready to begin the operations of construction, owing entirely to the overcrowded state of the machine and boiler shops and ship-yards, where the most important and essential portions of the required equipment had to be procured, that very little of the work of revetment for bank protection, and perhaps none of the permeable dikes for contracting the channel, will be actually completed before the time specified.

Moreover no trustworthy judgment of the stability and permanence of such works, and their probable adequacy and fitness for accomplishing the objects in view, can well be formed until they have withstood the severities of at least one high-river stage, while their positive effects upon the shoals and bars, and hence the measure of their practical value to the navigation of the river, cannot be fairly estimated, much less fully determined, until the ensuing period of low river. There are some objections also to putting down bank revetments on a rapidly rising river, as the Mississippi is known to be at the present time, unless the entire slope to the crest of the bank can be graded and covered about the same time; and this is impracticable, in large degree, under existing circumstances, for the reason that the pumps for two of the four grading boats will not be ready for delivery until some time during January next. It is probable that even when the plant is ready the stage of the river, which is unusually high for this season of the year, may still further protract the period of delay and render the commencement of work before the time mentioned in the act impossible.

A report, however, specifying the character and extent of different kinds of work, will be made as soon as there is anything worthy of note to communicate in the way of progress.

A statement of the amount and character of the expenditures to November 25, 1881, is given below.

With regard to the practicability of improving the navigation of the river below Cairo upon the general plan recommended, and to the full extent required by the increasing demands of commerce, attention is respectfully invited to the views of the Commission, as expressed on pages 16, 17, and 18 of the report dated February 17, 1880. (House Ex. Doc. No. 58, Forty-sixth Congress, second session.)

As a brief summary of those views, it may be here stated that the improvement is to be secured by narrowing the low-river channel-way to an approximately uniform width of 3,000 feet in localities where the widths are excessive and the navigation bad, to be accomplished and rendered permanent through the agency of such works as will also create a comparative uniformity in the width of the high-water channel.

For the attainment of this result two distinct classes of works, differing widely in character and purpose, will be required, viz, revetments for the protection of caving banks, and dikes or other structures for the contraction of the channel-way.

The bank revetments are intended not only to stop the constant, and in some localities very rapid, enlargement produced by erosion and caving of concave bends, but in addition thereto to check the growth of bars and shoals below by accretions supplied directly therefrom.

The process of laying this revetment will vary greatly in different localities, but will commonly, or at least in many cases, consist in first freeing the bank of snags, stumps, and brush, and then placing a mattress, composed of a wire netting, overlaid or interlaced with brush, upon that portion of the slope extending from deep water to a few feet above the water-level, and weighting it with sufficient riprap stone to hold it in place.

The revetment is afterwards completed by grading the bank above the water-level to a proper slope with streams of water under high pressure, after the manner commonly followed in hydraulic mining, and laying thereon a supplementary mattress, overlapping the one previously laid, and extending up to the crest of the bank. During the higher stages of the river, and where the water is not too deep, a single width

of mattress, suitably weighted, will, perhaps, suffice. It is presumed that stone, or a mixture of stone and gravel, will have to be freely used above the low-river level; but this most expensive item of the revetment can safely be omitted for two or three years, or until the strength of the brush is greatly impaired by decay. Whenever it may be deemed safe to omit the mattress on the upper part of the slope, and place the stone covering directly on the bank, that course will be pursued. It is hoped that above a certain height, not yet fully ascertained, a growth of willows or grass will afford sufficient protection.

Revetment work of this general character has given satisfaction at several points on the Missouri and Mississippi rivers, and no special or insurmountable difficulties are apprehended in its execution, either by methods and expedients heretofore employed elsewhere or by such modifications thereof as further experience may suggest.

The other class of works (those for contracting the width of the river) will consist mainly of light, permeable dikes, composed largely of piles, poles, brush, and wire, placed at suitable intervals, either longitudinally or transversly to the channel between and within which the stream, flowing with diminished velocity, is expected to deposit a portion of the solid material held in suspension, and thus build up new banks and establish new high-river shore lines for the corrected channel.

That these methods are practicable, although not yet beyond the experimental stage, and that they can, in some form or another, be rendered effective for the objects in view, is shown by the works already executed on the Mississippi and Missouri rivers.

Failures, disappointments, and imperfect results are to be expected in some degree when dealing with natural agencies of great magnitude, by means of novel and immatured expedients. It has been shown by years of patient and costly efforts that solid and heavy structures will not stand in the bed of the Mississippi River unless built to dimensions and carried to depths that would forbid their general use for purposes of channel improvement, and it may well be doubted whether the marvelous capacity of this great water-way will ever be usefully developed and made tributary to the power, wealth, and happiness of the people, unless it can be accomplished by the use of light and comparatively inexpensive devices, like those which have been named or that may be devised and perfected by experience.

It is the unanimous opinion of the Commission that the improvement of the navigation of the Mississippi River below Cairo, upon the general plan recommended in their report of February 17, 1880, is entirely practicable, and that the completion of the works for which partial estimates were then submitted, with others of similar character where the navigation is bad or may hereafter become so, will establish and maintain a continuous low-river channel, not less than 10 feet deep, over all the shoals and bars between Cairo and the Head of the Passes, with the possibility of attaining practicable depths considerably beyond that limit.

In making the required estimate of the total cost of these improvements, difficulties of a peculiar character are encountered. Among these may be mentioned the uncertainty necessarily attending novel methods of construction; the absence of precedents indicating the degree and promptness with which desired results may be achieved; the possible existence of undiscovered gravel beds which will have to be removed by dredging; and the probability that one of the effects of the improvement will be the development of bad bars, and the necessity of addi-

tional works, at localities where the navigation has heretofore been good.

The estimates of cost submitted in the report of February 17, 1880, for initial works upon six reaches of the river between Cairo and Vicksburg, embracing an aggregate length of 184 miles of bad navigation, amounts to $4,113,000, and it was stated as the opinion of Commission—

> That such additional works as will ultimately be required to complete and render permanent the improvement contemplated in this system at the localities specified will not exceed the amount stated as needed for initial works.

This would amount to $8,226,000 for 184 miles, or about $45,000 per mile.

These estimates cover about one-fourth of the length of the river where navigation needs improvement, viz, from Cairo to Red River; and assuming that the remaining three-fourths will cost proportionately, the aggregate cost of the entire improvement would reach $33,000,000.

It is proper to add that while one member of the Commission is of the opinion that these figures should be more liberal, all the others present regard them as ample, for the reason that they are based on detailed estimates covering the worst portion of the river.

The works heretofore recommended or undertaken by the Commission are those contemplated in section 5 of the organic act. The methods of construction adopted constitute what may be regarded as the details of a system, for the perfecting of which it would be necessary to arrange the order and extent of its application to the entire river.

To fix this order judiciously there is required information of an extensive character and wide scope, which the surveys, examinations, and observations now in progress are expected to furnish.

The Commission are, however, prepared to recommend the application of the methods and details heretofore described to the Lower River, from Commerce, Mo., downwards, with such continuity as will not only improve the immediate localities where navigation is now bad, but will also establish and retain such control over the high-water discharge as will arrest that tendency towards deterioration which has rendered the systematic improvement of the entire river necessary.

While this order of progress is proper for works designed to amend and regulate the existing channel, those undertaken for the purpose of retaining or increasing the volume of discharge within the bed, such as levees and dams for closing outlets, should begin below and be carried continuously up stream.

Statement of moneys expended from the appropriation for "Improving Mississippi River."
(*Act of March* 3, 1881.)

Amount appropriated	$1,000,000 00
Amount expended to November 25, 1881, including outstanding liabilities, for steamboats, grading boats, pile-drivers, barges, and other floating plant; for materials, tools, supplies, and labor for beginning and carrying on the work at Plum Point and Lake Providence, and for subsisting and quartering the labor employed	250,000 00
Balance which it is estimated will be required during the remainder of the present fiscal year	750,000 000
	1,000,000 00

The estimate for next fiscal year for works of improvement, which was forwarded through the Chief of Engineers on the 8th of last July, is repeated below.

ESTIMATE OF FUNDS FOR WORKS OF IMPROVEMENT FOR NEXT FISCAL YEAR.

For initial work for contracting the channel and protecting caving banks on six reaches of the river, constituting a length of 184 miles, viz: New Madrid Reach, 40 miles long; the Plum Point Reach, 30 miles long; the Memphis Reach, 16 miles long; the Helena Reach, 30 miles long; the Choctaw Bend, 35 miles long, and the Lake Providence Reach, 30 miles long	$3,113,000 00
For closing existing gaps in levees	1,010,000 00
Total	4,123,000 00

OUTLETS AND LEVEES.

Much attention has been given by the Commission to the subject of outlets and levees since its first report, in which their effect and value were partially discussed.

The collection and presentation of facts on this subject has been entrusted to a committee who have made it a matter of special study, and whose reports will be found attached hereto as Appendixes F and H in this, and Appendix E in the last preceding report of the Commission. In the reports of that committee, hereto appended, will be found many facts of interest and importance bearing upon the subject of the relation of levees to channel improvement. Other facts bearing on the same subject will be found in the report of W. H. Powless, which forms Appendix D of this report.

It is believed that they corroborate the views expressed by the large majority of the Commission in a former report, and repeated in this.

The utility of levees as a means to "prevent destructive floods," which is one of the ends enumerated in the act creating the Commission, is too obvious to require comment. The importance to be attached to that object is a matter wholly within the discretion of Congress, and not suitable to be discussed here.

The utility of levees as a means to "deepen the channel" of the river, and "improve and give safety and ease to the navigation thereof," which are other ends enumerated in the act, is a subject on which differences of opinion exist, and in respect to which the facts collected do not carry equal weight as evidence to the minds of all the members of the Commission. It is considered by all that levees, by confining the flood waters of the river within a comparatively restricted space, do tend, in some degree, to increase the scouring and deepening power of the current. But the extent and potency of their influence in the improvement of the low-water channel, in respect to which, for the purpose of navigation merely, improvement is most needed, and their value, for that purpose, as compared with other methods of improvement, and as compared with their cost, are regarded as subjects requiring further observation and study, and the accumulation of further and more comprehensive data, before final conclusions can be reached concerning them. In the mean time, and in the existing state of knowledge on the subject, the present judgment of the Commission cannot be better expressed than in the words of their report of February 17, 1880, from which the following extract is submitted:

> Levees have never been erected upon the banks of the Mississippi River except for the special purpose of protecting the alluvial lands from overflow. They have, therefore, always had sole reference to the high-water stage, and the degree to which levees

might prudently be relied upon "to improve and give safety to navigation," "promote and facilitate commerce, trade, and the postal service," has not hitherto entered into the question of the construction and maintenance of a levee system.

There is no doubt that the levees exert a direct action in deepening the channel and enlarging the bed of the river during those periods of "rise" or "flood," when by preventing the dispersion of the flood-waters over the adjacent low lands, either over the river banks or through bayous and other openings, they actually cause the water to rise to a higher level within the river-bed than it would attain if not thus restrained.

It would seem to follow, from the law that the volume of water flowing in the bed determines the size, that, prior to the construction of levees, the area of the mean cross-section of bed of the Mississippi River must have been less than it was after the levees had reached their most efficient condition, assuming, what is believed to be true, that the average rainfall in the Mississippi Valley has not materially changed within the last hundred years.

There is some evidence in a comparison of the results of Young, Poussin, and Tuttle's examination of 1821 with later surveys, that the width of the river has increased since that date.

As silt-bearing streams in alluvial districts have a tendency to assume in the straight reaches cross-sections which are arcs of circles, and in the bends curves of deeper forms, it follows that any general widening of the river resulting from concentration or increase of volume which may have taken place, would, as a rule, be accompanied by a general and corresponding deepening as the result of such general enlargement, although local shoalings, temporarily injurious to navigation, might occur.

There is reason to believe that during the period when levees were in their most perfect condition, from 1850 to 1858, the channel of the river was better, generally, for purposes of navigation than it has been since that time.

It is known that during the last twenty years the levee system has been continuously interrupted by a great number of crevasses between Cairo and Red River.

Before the levees were built a large portion of the flood-waters spread out over the banks of the river in a thin sheet, of which the average depth at the margin of the stream, where it escaped, did not probably exceed a few inches, or, at most, a foot. The immediate effect of the levees would be to increase the volume and height, and accelerate the velocity of the flood-waters between them, resulting in an erosion and deepening of the river-bed, and ultimately in a corresponding lowering of the flood-slope, in accordance with the general law already quoted—that an increase in the normal volume of discharge in a sedimentary stream, flowing through alluvial deposits, results ultimately in a lowering of the flood-surface. It would seem, therefore, that a closure of the crevasses might be expected to accelerate the removal of those shoals which have been produced by them, and if their closure be accompanied by the requisite contraction of the channel to a more nearly uniform high-water width, a lowering of the flood-level may be expected to such extent as will ultimately render the maintenance of the levees as an aid to navigation practically needless above Red River, and greatly lessen the necessity of their permanent maintenance for that purpose below Red River, even at a reduced height.

While it is not claimed that levees in themselves are necessary as a means of securing ultimately a deep channel for navigation, it is believed that the repair and maintenance of the extensive lines already existing will hasten the work of channel improvement through the increased scour and depth of river bed which they would produce during the high-river stages. They are regarded as a desirable, though not a necessary, adjunct in the general system of improvement submitted.

It is obvious that levees are, upon a large portion of the river, essential to prevent destruction to life and property by overflow. They give safety and ease to navigation and promote and facilitate commerce and trade by establishing banks or landing-places above the reach of floods, upon which produce can be placed while awaiting shipment, and where steamboats and other river craft can land in times of high-water.

In a restricted sense as auxiliary to a plan of channel improvement only, the construction and maintenance of a levee system is not demanded. But in a larger sense, as embracing not only beneficial effects upon the channel, but as a protection against destructive floods, a levee system is essential, and such system also promotes and facilitates commerce, trade, and the postal service.

A levee system aids and facilitates the postal service by protecting from injury and destruction by freshets and floods the various common roads and railways upon which that service is conducted to and from the river bank, and generally within that portion of the alluvial region subject to overflow. Moreover, the permanent maintenance below Cairo of a connected levee system, a system of sufficient strength to inspire confidence in its efficiency, or the demonstration, by the achieved results of an improved river, that overflow need no longer be seriously apprehended, would act as a prompt and powerful stimulant in rapidly developing a largely increased trade and commerce in all the products of agricultural industry indigenous to that region, and in those branches of manufacturing enterprises related thereto.

The Commission are not in possession of the data deemed necessary in making a trustworthy estimate of the entire cost of a levee system, but a great reduction is evidently practicable in the amount of former estimates based on the assumed existence a river-bed not subject to erosion, and on levee work at 40 to 50 cents per cubic yard.

The cost of levee work in the State of Louisiana during the last four years has averaged less than 20 cents per cubic yard.

The discussion in Appendix F establishes a strong presumption that the levees of the Mississippi do not now stand as works superimposed on the normal banks to restrain an additional flood volume and elevation, which they themselves have produced, but as artificial barriers to replace that natural height of bank which has been lost from causes connected with the occupation and cultivation, not only of the banks of the main stream, but also of the basins drained by the tributaries.

Their present function is not so much to increase the flood volume abnormally, as to maintain that part of it which would otherwise be lost from the degradation of the banks.

It may be said of outlets (which term we restrict to well defined depressions connecting the river with the swamps and their drains, on either side, while it is still within its banks), that whenever they are directly connected with the improvement and maintenance of navigation, they should be efficiently and permanently closed.

RED AND ATCHAFALAYA RIVERS.

The Commission regard the present condition of the junction of the Mississippi, Red, and Atchafalaya rivers as largely involving the questions of the navigation and the permanent location of the first named stream. The special investigation of the subject has been given to a committee, whose report appears as Appendix G. The Commission have, on two occasions, visited the locality.

The enlargement of the Atchafalaya River has steadily progressed since the removal of the raft therefrom by the State of Louisiana. Now it has a capacity of discharge nearly equal to Red River, and affords the line of least resistance for the flow of that stream to the sea. The discharge of Red River into the Mississippi is now small and infrequent. The outlet from the Mississippi to the Atchafalaya is almost constant, and, at times, very large. The elevation of the water surface at the junction of Old River* and the Mississippi is almost constantly above that at the head of the Atchafalaya, the difference on the 13th of last October, being 7.3 feet in a distance of about five miles.

There is a marked tendency to increase this difference of level, and, also, to enlarge both the communication between the Mississippi and the Atchafalaya, and the Atchafalaya itself.

Since the presentation of the report of the committee (Appendix G), the following facts have been observed:

1st. The lower arm of Old River, being now the communication between the Mississippi and the Atchafalaya rivers, has heretofore been broad and shallow, with flat banks to the channel. These banks have become so steep as to cave largely, throughout a considerable part of their length, during the extreme low-water of the present season.

2d. The Mississippi River side of Carr's Point, above the junction of Old River and the Mississippi, is caving badly, bringing the channel and the head of the crossing of Angola Bar much lower down than

*By Old River is meant the lower arm of the old bend of the Mississippi lying south and west of Turnbull Island. (See Appendix G, Plate 1.)

formerly. Should this movement continue until the bar is carried below the mouth of Old River, the diversion of a larger flow from the Mississippi may be expected.

No decrease of flood heights on the Mississippi, from which volume has been abstracted is observable, as the result of increased outlet in the gauge records at Natchez, Red River, or Baton Rouge, although it practically amounts to the diversion of a tributary with about one-sixth of the flood discharge of the Mississippi, but such a decrease of flood elevation has been observed on the Atchafalaya, to which the volume abstracted from the Mississippi has been added.

Under such conditions the continued diversion of larger parts of the volume of the main river is apprehended, without proportional relief in floods, until such time as its navigation, and the interests depending on this outlet to the sea, shall be seriously impaired.

The Commission therefore adopt the recommendations of its committee, as reported in Appendix G, as follows:

We therefore recommend that, at the earliest possible time, a continuous brush sill be laid across Old River, between Turnbull's Island and the Mississippi, at such point as surveys show to be advisable, with the object of checking the enlargement of the outlet from the Mississippi at that point.

This sill should have a base of not less than 200 feet, and a navigable channel over its crest of 5 by 200 feet, at extreme low-water in the Mississippi. It should be continued up, and for some distance on the banks, and be well secured throughout with ballast. The growth of willows on the upper part should be encouraged.

The banks above and below the sill should be protected against washing or caving.

We also recommend that the study of the subject be continued in order to ascertain—

1st. The expediency of completing the divorce between the Mississippi, on the one hand, and the Red and Atchafalaya rivers on the other.

2d. The feasability of giving navigable access to the Atchafalaya, Teche, and Red rivers, through locks in Bayou Plaquemine.

3d. The improvements needed for the navigation of the Plaquemine, and of the Atchafalaya above its junction with that stream.

4th. The improvements needed in the Atchafalaya below the junction of the Plaquemine, for navigation and to give vent to the increasing discharge from above.

FLOODS ON THE MISSOURI IN 1881.

Among the appendixes to this report will be found a report from the committee on levees and outlets concerning the remarkable floods which occurred on the Missouri River in the spring of 1881. The last of these floods was characterized by a general overflow of the valley for a distance of about 600 miles from Sioux City, the initial point of the observations, and extending to within less than 200 miles from the mouth of the river. As the rise came solely from above Sioux City, and was entirely uncomplicated by tributary action, an unusually favorable opportunity was afforded for observing the effect of overflow upon the movements of a large body of water. Study of the observed facts shows that the great retardation of the free flow of the water, superinduced by the enormous increase in sectional area, was sufficient to cause the water to pile up till an abnormal flood height was reached, amounting at various points to from 5 to 8 feet, and that the effects of this abnormal rise were not lost, even after the river had got within its banks, in the distance covered by these observations.

A very marked diminution in the velocity of the current was also noticed during the period of overflow, and, as a consequence, a decided filling up of the bed of the stream. The general effect of all this was to cause very radical and extensive changes in the location of the channel at the ensuing low-water, changes sufficiently great to exercise very serious influence on the projected but incomplete system of improvement works.

The facts brought to light by these observations will probably, in many instances, afford an explanation of the great heights attained locally by recorded floods, for which heretofore no satisfactory reason could be given. The memorable flood of 1844 certainly comes under this head, so far as the Missouri is concerned. This flood is known to have been caused by a violent freshet, which came out of the Kaw River at Kansas City, on top of the ordinary June rise, the other southern tributaries, Osage, Gasconade, &c., being also in flood at the same time. The valley below Kansas City was deeply inundated, and the height of the flood-wave increased as it progressed down stream, as in the spring flood of 1881. At Kansas City it reached a height of 3.1 feet above the flood of 1881, at Cedar City 6 feet above, and at Saint Charles 9 feet. Above low-water plane of 1880 these heights are respectively 25, 24.4, and 30 feet.

The conclusions deduced from a study of the facts here presented, seem to indicate that in this case an overflow of the banks, so far from affording relief increased the height of the flood-crest at points below where the overflow commenced; while conversely they would also indicate, that, preventing such overflow would have lowered the whole flood surface. This is the function which levees might here have been expected to perform, and their importance in preventing such overflow applies, not merely to the protection of the alluvial lands on the river bank from inundation, but also to the prevention of injurious deposits in the river-bed, which have been shown to accompany this overflow of the banks In other words, in a comprehensive scheme of improvement, it is essential that the water reaching the river, whether at high or at low stages, shall be kept thoroughly under control throughout its course, and that its action shall be so concentrated by suitable works as to insure that a water-way shall be excavated of sufficient size to pass off any water which may arrive with the least possible elevation of flood-level. This requires that both the high and low-water widths shall be approximately uniform and of suitable dimensions to accomplish the objects sought, while large losses of water, either by lateral outlets, or by escape over the banks shall be effectually prevented.

BORINGS.

Until quite recently, it was generally assumed that the present bed of the Mississippi River consisted of layers of extremely tenacious blue clay belonging to the tertiary formations. On the further assumption that these clay layers would stand almost indefinitely the wearing action of the current, was based the assertion that the present bed of the river must be considered as practically permanent. Of late years these views have been much criticised, and in order to set the matter on a proper basis, borings in the alluvial region were undertaken by the Engineer Department United States Army, and carried on in 1877–'78 and '79. Prior to the organization of this Commission 67 borings had been made, and under the direction of the Commisssion 16 more have been added to the list, making a total of 83, full details of which will be found among the appendixes to this report. (See Appendixes J, J1, J2.) These examinations have been extended from Cairo to Hay's Landing, 40 miles above Vicksburg, and embrace borings made at or in the vicinity of Cairo, New Madrid, Plum Point, Memphis, Helena, Choctaw Bar, Greenville and Lake Providence. Although the greater portion of these borings were over 100 feet in depth, while many exceeded 200 feet, yet, out of the whole number of 83, only 22 pierced through the alluvial strata to what are supposed to be the teritary beds underlying

them. It is therefore almost certain, at least for the portion of the valley examined, that the great trough in which the Mississippi now flows was carved out by a stream of much greater size than the present river, and it is in this respect analogous to the rocky valleys of nearly all the tributaries, in which the alluvial beds, resting on the rock-floor of the valley, are of much greater depth than that of the present streams.

The mean depth of the undoubtedly alluvial beds, as given by these borings, is 131 feet below high-water of 1880, and as the average of the maximum high-water depths in the bends is less than 100 feet, it follows that it can only be in isolated and entirely exceptional cases that the river scours down to the deep-lying tertiary strata, and that there is a considerable margin for additional deepening, if such were ever necessary, without disturbing these layers at all. But there is, moreover, no ground whatever for supposing that they would offer any extraordinary resistance to erosion. They consist, in the northern portion of the valley, of clay and sand, with beds of lignite; to the south, green sand, marls, and marly clays are found. The clays generally contain so much sand that they would offer no great resistance to the action of flowing water. Moreover, on the New Madrid and Plum Point reaches, where the examinations were very thorough, the borings show the elevations of the supposed tertiary strata, at points but a few miles apart, as differing by over 100 feet. There need, therefore, be no apprehension of difficulty in obtaining any depth deemed necessary in the portion of the river which has so far been examined.

This conclusion, from an engineering point of view, is extremely important, and removes one of the greatest of the difficulties which it had been apprehended would interfere with the thorough and complete improvement of the river.

Among other questions affected is that of levees. On the assumption of an immovable river-bed, heights have been proposed for levees which are now seen to be unnecessarily great. Hence a very considerable reduction in the estimated cost of this improvement, according to former plans, can safely be made on this ground alone.

The data presented on this subject have, apart from the engineering point of view, from which it is here principally treated, great value in a purely scientific light, as advancing the knowledge of the geological history and formation of the Mississippi Valley. To utilize the data for this purpose, they have been placed at the disposal of Prof. E. W. Hilgard, from whom an opinion on the subject is expected.

MUTUAL RELATIONS OF SECTIONS UNDER VARYING CONDITIONS OF DISCHARGE AND CURVATURE.

The paper by Mr. McMath, under the above title (Appendix K), is theoretical, but only in the sense that it proposes to place certain observed phenomena in their natural order and relation by supplying the missing links of the chain.

The river flows through a yielding soil, and were its volume and elevation from season to season constant, would adjust itself to its bed and maintain a permanent pathway to the sea. But the river in flood and the river in low stage present such contrasts of elevation, velocity, and even direction, that we have, in effect, two different streams, alternately flowing along the same general course, each disposed to modify the mould of the other, and each, in more or less degree, obstructed by the work of its predecessor. Add to this conception the more difficult one

of intermediate rising and falling stages, with their complications of action and reaction, and it is no surprise that many transitory elements escape observation, to be restored only by careful induction on the part of the student who would render a logical account.

The writer presents us first with the conception of a stream of uniform width and permanent bed, but with depth varying from point to point, and discharge varying from time to time. He shows us the surface slopes and the relative changes of these with volume of discharge. He then proceeds, step by step, to release the supposititious river from restraints, and finally presents us with transverse sections of adjacent *pool* and *bar* typical of the actual river. Reversing now the course of his reasoning, he shows us how an increase or diminution of discharge causes these sections to enlarge or contract, each exercising a controlling influence over the other alternately, and furthermore, exhibits the shift in the locus of the stream which takes place as the surface rises or falls.

Papers of this description, necessarily imperfect in the present state of knowledge, are not without material value, since they eliminate from further discussion some well determined points, and thus narrow the field of conjecture. In the present instance a discussion of the kind we have indicated has an indirect bearing upon questions of *revetment* and *contraction* which the Commission are about to entertain practically.

HARBOR OF VICKSBURG, MISSISSIPPI.

The Commission having been requested to investigate the condition of affairs at this locality with a view to making a special report on the subject, a low-water survey was made in the fall of 1880, extending from the head of Paw Paw Island to Delta, La., a distance of 23 miles. With the information thus obtained, and after full conference with Maj. W. H. H. Benyaurd, U. S. Engineers, in local charge of the work now being carried on under the Engineer Department, United States Army. the Commission have to report as follows:

On April 27, 1876, the river broke through the long peninsula which extended from the Louisiana shore across the front of the city of Vicksburg. The break occurred opposite the lower portion of the city, and all the wharf front, warehouses, elevators, &c., were left on a lake, in which the remains of the old peninsula appear as an island. The damaging changes produced in the regimen of the river by this cut-off were very great. Its effects are plainly traceable for 100 miles above and below, in great changes in the channel, and in very extensive bank erosions, as shown by the records of levee construction in Louisiana and Mississippi. These results are such as invariably follow the formation of cut-offs.

In the immediate vicinity of Vicksburg the damage done was very great. The Delta Point began to recede rapidly, the bottoms below the Vicksburg Bluffs were deeply eroded and a new bend developed there, while the whole river traveled down stream and receded from the city. The harbor proper of Vicksburg, which was the finest on the river, and which had remained substantially unchanged since the earliest records, began soon to silt up, and in 1877 this deterioration had assumed such alarming proportions that a Board of Engineer Officers was convened to examine the locality and to devise a plan of improvement. Their report, accompanied with maps, bears date of January 22, 1878, and was published as Senate Ex. Doc. No. 55, Forty-fifth Congress, second session. It also appears in the report of the Chief of Engineers for 1878, Part I, Appendix L, page 638.

The situation of affairs at the time of this examination, and the probable causes thereof, are described in the report of the Board as follows:

The preliminary report of the Board sets forth the condition of affairs at Vicksburg at the date of their visit. Since that time the recession of the Delta Point has been steadily progressing, as well as the caving of the Mississippi bank below Vicksburg. The erosion at the point has been at the rate of 300 feet a month during the flood stages, and will probably average over 100 feet per month throughout the year. The dry bar below the point moves down with it, and has already extended past the landing at Delta.

The filling up of the harbor of Vicksburg has progressed rapidly, and although the extreme stage of low-water was not reached, the soundings taken about the middle of August, 1877, showed that at low-water the bottom of the river would be dry as far up as Crawford street, between the elevator and wharf-boat. This filling in has been going on ever since, so that the situation of affairs is really much worse than is shown by the maps. It appears from the soundings and from float observations that a considerable quantity of water thrown off from the main body of the stream follows approximately the direction of the shore line above the Delta Point, and striking the Vicksburg shore obliquely is deflected up stream as an eddy current, having along the city front a velocity of about a mile an hour. The water thus entering the lower end of the harbor flows around De Soto Island and out at the upper end of the lake. The action of this eddy current has been to cause an immense deposit of mud in the harbor itself, and also on the line of an ideal prolongation of De Soto Island toward Ryan's saw-mill. The west end of the old bed has not been appreciably silted up, all the deposits having apparently taken place in the portion nearest Vicksburg.

It appears from these facts that if at the time of the cut-off the Delta Point had been held, this mud-carrying current would have passed up to the west of De Soto Island, and that channel would have been silted up and closed, as is usually the case with these cut-off lakes.

The harbor in that case would probably have remained an open lake having a narrow passage to the river at its lower end; but this passage could probably have been enlarged and kept open by a moderate amount of dredging annually. As the case actually stood, however, the Delta Point was unprotected, and receded rapidly under the action of the current, so that the water thrown off from the main body in the direction of the old channel, instead of being deflected by the island into the west arm of the lake, was allowed to strike the Vicksburg shore and to be by that means directed into the east arm of the lake or harbor proper.

The Board recommended:

1st. That the Delta Point be protected by suitable revetment from further recession.

2d. That a dike reaching to high-water mark be constructed on the crest of the bar, extending from De Soto Island towards Ryan's sawmill, the cost of this dike to be reduced as far as possible by inducing deposits on the crest and outer slope of the bar by suitable silt-catching devices.

3d. The dredging out of the inner harbor, and the maintenance of an open mouth at the lower end by dredging. This work to follow the completion of items 1 and 2.

4th. If these measures proved insufficient, to divert the Yazoo into the lake, to assist in keeping it open. The estimates were as follows:

Revetment of Delta Point	$84,000
Construction of dike	90,100
Dredging	80,000
Diversion of Yazoo River	1,830,000

In 1878 Congress appropriated $84,000 for this work; in 1879, $50,000; in 1880, $20,000; and in 1881, $75,000, making a total of $229,000. All the work done so far has been upon the Delta Point revetment, which, owing to many unforseen difficulties, has proved much more costly than was anticipated. It has been successful so far as it has progressed, but is not yet completed. Meanwhile, the deposits of the river have so built up the bar at the mouth of the harbor that it now fulfills substantially the office that the bar-dike proposed by the Engineer Board was designed

to accomplish, and during the last two years it is reported that there has been no additional fill in the harbor proper. This being the case, the officer in charge now proposes to carry out the third part of the original project, viz, to dredge out a basin of sufficient size in the harbor, and also a canal to connect this basin with the main river. The amount of dredging now needed is greatly in excess of what was originally deemed necessary, as the unobstructed access of the river deposits has filled up the lower end of the harbor to such an extent that it now goes dry at a stage of 20 feet above low-water. The upper end of the harbor is still open, but so much loss of time is involved in taking this circuitous channel, that at low-water the wharf boats are moved down below the bar, and nearly 2 miles from the old landing. The amount of dredging required is estimated to cost $336,000, while the completion of the Delta Point revetment will require $100,000 more, a total of $436,000, of which $250,000 can be profitably expended in one year.

With regard to this plan the Commission have to state that while other methods could doubtless be devised for a more complete restoration of the harbor of Vicksburg, yet all such plans would necessarily involve changing the direction and location of the present channel, and the works would require to be extended over many miles of the river in order to get it fairly under control. While such methods can certainly not be pronounced impracticable, yet they would in this neighborhood be very costly. On the other hand, the present plan commends itself by its comparative economy, and its adaptation to the situation of affairs which actually exists, and the Commission therefore recommend that the necessary appropriations be made to enable the work to be carried to completion. The question of the diversion of the Yazoo is not here considered. It could only be supplemental in its effects to the works now proposed, and its necessity or otherwise can only be fairly determined when these works are completed.

BONNET CARRÉ CREVASSE.

At the request of Hon. C. E. Hooker, M. C., referred to the Commission by the Secretary of War, a survey is being made to afford information relative to the cost and best manner of closing Bonnet Carré crevasse, Louisiana.

The benefit of this work would extend to the interests and industries on the shores of Lakes Ponchartrain and Borgne and of Mississippi Sound. When the survey is completed a report will be made thereon.

ON THE IMPROVEMENT OF THE MISSISSIPPI RIVER BETWEEN THE MISSOURI AND THE OHIO.

The Commission, in their reports of March 6, 1880, and of January 8, 1881, have expressed their views as to the methods to be followed in improving the navigation of the Mississippi River between Cairo and New Orleans, and between Saint Paul and the mouth of the Missouri River.

They have not heretofore discussed the part of the river lying between the Missouri and the Ohio, and having a length of 203 miles. This portion of the river flows in an alluvial valley bounded by rock bluffs usually between 3 and 6 miles apart. At two places, however, namely, near Grand Tower and above Commerce, the river runs between rock bluffs only about a mile apart, but at these places there are alluvial valleys at about the level of the river in flood, behind one of the bluffs forming the present bank of the river. Through these valleys the river

may once have flowed. At Commerce, 34 miles above Cairo, the valley widens into the great alluvial basin of the Lower Mississippi.

For much of the distance between the Missouri and the Ohio rivers the Mississippi flows in contact with the rock bluffs on one side or the other, and when it leaves them it wanders at will through the alluvial valley whose general height is that of ordinary floods. In such places the same phenomena of caving banks and changing positions of the river are found as in the lower river, limited here, however, by the much smaller width of the alluvial bottom.

Above the Missouri the Mississippi is relatively a clear river, carrying little sediment in suspension save at the time of floods. Its character is greatly modified by the introduction of the Missouri River, whose sediment in suspension during the year 1879, at Saint Charles, reached the very large amount by weight of $\frac{1}{265}$ part of the total river-discharge, and on July 4, 1879, was by weight $\frac{1}{37}$ part of the river-discharge on that day. (See report of Major Suter of February 2, 1881, to Chief of Engineers.) If the average discharge of the Missouri be taken as one-half that of the Mississippi above their junction $\frac{1}{560}$ would result for the average sediment ratio for the combined rivers on the supposition that no sediment whatever was derived from the Upper Mississippi.

The effect of this large amount of sediment is felt in the Mississippi far below their junction. Humphreys and Abbot give for the mean ratio by weight of sediment to water for two years at Carrollton $\frac{1}{1600}$, and for nine months at Columbus (March to November) $\frac{1}{1321}$. This indicates that the mean ratio of sediment in the Mississippi diminishes rapidly from the mouth of the Missouri to Columbus, and that below Columbus it undergoes no great change.

The low-water discharge at Saint Louis is about 47,000 cubic feet per second; the high-water discharge is fifteen or twenty times that amount. At Saint Louis the range in stage is 37 feet and at Cairo 51.

The low-water slope is about 0.56 feet per mile from Saint Louis to Gray's Point, 140 miles below.

Between Saint Louis and Cairo there are many places where at low-water the depth becomes too small for navigation. These points are not all bad in every year, but sometimes one and sometimes another gives trouble. In the fall of 1879 the shoalest places between Saint Louis and Cairo were at Widow Beard's Island, 16 miles below Saint Louis, where the depth fell to 4 feet 4 inches, and at Kaskaskia Bend, 63 miles below Saint Louis, where it fell to 4 feet.

Wherever the river in straight reaches at low-water largely exceeds 2,500 feet in width it is liable to give bad navigation.

The commerce on the river between Saint Louis and Cairo is of similar character, needs the same facilities, and makes the same demands as below Cairo, and as it is proposed ultimately to attain a least depth of 10 feet below Cairo, this depth should also ultimately be obtained between Cairo and Saint Louis. In obtaining this depth, the problem is the same as on the lower river, save at Grand Chain, where it may be advisable to remove some bowlders and perhaps to cut off some points of rocks, which at low-water hamper navigation.

Elsewhere the system to be pursued is that of contraction, thus compelling the river to scour out its bed; this process being aided, if necessary, by dredging. Wherever the river is causing any serious caving of its banks, the improvement will not be permanent until the bank has been protected and the caving has been stopped.

The methods of protecting caving banks, and of producing contraction where the river is now too wide, are of the same general character as

those needed for the lower river. For bank protection below low-water, matresses must be used, between low-water and a medium stage, the banks must be covered with stone until some cheaper protection which will be permanent has been found, while above high medium stages some woody or vegetable growth that can resist the action of water during the season of floods, may be effectual.

Contraction must be obtained by structures on the sites where shoaling is desired, which, while strong enough to resist the current, are yet permeable enough to diminish the velocity of the water through them to the proper degree for causing a prompt deposition of sediment, thus leading the river to build up a new bank which shall give a less width and a greater depth to the river.

These principles are being followed by Capt. O. H. Ernst, who has charge of the improvement of the river between the Illinois and the Ohio, and the success which he has already obtained at Horsetail Bar, below Saint Louis, gives strong hopes that similiar results may follow elsewhere the application of similiar methods.

The general method followed at Horsetail has been to erect along the site of the desired new bank a permeable screen, having a general parallelism with the shore, and then to connect this screen with the shore by transverse permeable screens about 400 feet apart, thus cutting up the area on which deposit is wished into sections 400 feet in width.

These screens have been of various forms, the later construction being of hurdle work kept in place by piling. Their object is to diminish the velocity of the water while passing through the various sections of the area covered by them, enough and only enough to cause free deposit. In bank protection Captain Ernst proposes to use matresses or hurdle work for the portion below low-water, stone from that line to 16 feet above low-water, and willow plantations for all greater heights.

The high-water width aimed at is 2,500 feet, and it is expected that this width will give at least 8 feet at low-water where there is now less.

Further experience may doubtless suggest modifications and improvements in details, and will show whether a somewhat greater contraction is needed to secure 10 feet of water.

The success of Captain Ernst's works thus far justifies, in our opinion, the methods he has employed and we are of opinion that it should be pushed toward completion under liberal appropriations.

LEGISLATION.

The Commission renew the recommendation contained in a former report, that provision be made by law for the appropriation of land or material, when needed in the improvement of the river and not otherwise obtainable, and for the assessment and payment of damages to the owners of property so appropriated. Of some kinds of material which will be needed in the prosecution of the contemplated improvements the amounts required will be very large, and to be compelled to submit to such terms as owners should see fit to impose in the purchase of it might subject the work to unreasonable expense or great delay.

It is recommended that authority be given to the Commission, or any person in charge of any work under authority of the Commission, to apply in the name of the United States in the district court of the United States for the district in which the land or material to be appropriated is situated, for an assessment of damages in favor of the owner; that some simple mode of procedure be provided, comprising such regulations as to petition, notice, assessment, appeal, and payment as shall fully protect the rights both of the government and the citizen; that the

same proceeding be made available to the owner of property taken, in case of failure by the proper officers of the government to begin or complete it, and that such remedy be made exclusive of any other claim or cause of action against the government, or the Commission, or any one acting by their authority.

In addition to such legislation as shall be necessary to authorize the appropriation of private property and assessment of damages therefor, it is desirable that Congress should, by law, declare to what extent the river shall be under the control of the Commission, during the progress of works of improvement, and to what extent, and under what circumstances material found in the river may be used in such works without compensation to riparian owners. Of those materials of which the largest quantities will be needed, such as brush, small trees, and gravel, a considerable supply can be found on bars and islands of recent formation in the river. It is believed by the Commission that, for the purpose of improving the river, any material found within its banks ought to be available without payment to any one.

It will necessarily result from the methods of improvement contemplated by the Commission, that large areas of the present river-bed will be built up by deposits of sediment into new banks. It is by the erection and maintenance of such banks that it is expected to form new shore-lines for the river at points where contraction works are to be located. In many such cases it will be useful to plant on the surface of such elevated areas willows and other trees, in order to carry the deposit of sediment up to the limit of high-water, and to strengthen the newly-made bank. It is highly important, therefore, that the control of the Commission over such areas shall continue superior to any claim of the riparian proprietor, until the improvement undertaken at that point shall be permanently completed. The same remark is true of the graded surface which may be given to caving banks, as part of the system of improvement adopted for their protection. In some such cases the slope above low-water will be planted with grass or willows, and in others covered with stone or gravel. But in respect to all of them, it is important that the control of the Commission over them shall continue until the purpose to be subserved by their improvement shall have been fully accomplished.

It is recommended also that the boats, machines, tools, and other property used in the prosecution of the work of the Commission, and the stations, bench-marks, gauges, reference-stones, and other monuments of surveys or observations be protected from interference or injury, by suitable penalties.

All of which is respectfully submitted.

Q. A. GILLMORE,
Lieutenant-Colonel Engineers, Bvt. Maj. Gen.,
President Mississippi River Commission.
C. B. COMSTOCK,
Lieutenant-Colonel of Engineers and Bvt. Brig. Gen.
CHAS. R. SUTER,
Major of Engineers, U. S. A.
HENRY MITCHELL,
Coast and Geodetic Survey.
B. M. HARROD.
R. S. TAYLOR.

The Hon. ROBT. T. LINCOLN,
Secretary of War, Washington, D. C.
(Sent through the Chief of Engineers.)

LIST OF PAPERS ACCOMPANYING THE FOREGOING REPORT.

Annual reports of the secretary ..... APPENDIX A.
Final report upon and results of secondary triangulation from Cairo to Memphis. (One plate in two sheets) ..... APPENDIX B.
Tabulated positions ..... APPENDIX B 1.
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Report on observations at Plum Point, November, 1879–November, 1880. (Ten plates) ..... APPENDIX D
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Report of Committee on Levees and Outlets upon the degradation of the banks of the river. (Three plates) ..... APPENDIX F.
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Report of Committee on Levees and Outlets upon the floods of the Missouri River of April–May, 1881. (Six plates) ..... APPENDIX H.
Report upon borings at various points on the Mississippi River. (Thirteen plates) ..... APPENDIX J.
Letter of Maj. Charles R. Suter, giving information collected concerning borings made in the Mississippi Valley between Cairo and Vicksburg previous to the organization of the Commission ..... APPENDIX J 1.
Report of J. W. Nier, assistant engineer, to Maj. Charles R. Suter upon the construction of a boring apparatus .. .. APPENDIX J 2.
Report of Assistant Robert E. McMath upon the mutual relations of sections under varying conditions of discharge and curvature ..... APPENDIX K.

APPENDIX A.

ANNUAL REPORTS OF THE SECRETARY OF THE COMMISSION UPON THE FIELD WORK OF SURVEYS.

OFFICE OF MISSISSIPPI RIVER COMMISSION,
2828 *Washington Avenue, Saint Louis, Mo., June* 21, 1880.

GENERAL: I have the honor to submit the following report upon the field work of the last season's surveys:

Outfit.—The sources from which boats, &c., were procured, and the initial repairs which were found necessary, have been mentioned in previous reports.

Current repairs have been kept up as far as practicable, and the outfit is in much the same condition as it was at the beginning of the season, except the necessary and natural deterioration incident to the work.

The survey-boat Hampton is really unfit for use in any work where men would be required to live on board of her. Her hull is so bad as to make it impossible to caulk her, and she is now leaking so badly that she has to be pumped several times a day to keep her afloat. I should not be surprised to have her sink any day, and have had all the property removed from her and stored on the other boats.

The remaining survey boats are in reasonably good condition. All of them need their roofs repainted, and the Mississippi and Tennessee are reported as needing something to prevent the rain from driving in around the windows and doors.

Of the launches, the Mignon and Irene only are now in the possession of the Commission, the Mary and Wasp having been returned to Captain Mackenzie at his request. The latter were put in good repair.

The Mignon is in good repair, or was when laid up, and it is not probable that she will need anything further to fit her for another season.

The Irene is also in good repair, except some minor items about the engine. But she is found to have an excess of power, as at present arranged, and her wheel or buckets should be enlarged, which would decrease the number of revolutions for the same steam pressure and increase her performance.

Captain Mackenzie informs me that he has made a like change in another boat, of the same size and pattern, with good results.

Of the small boats in use during the past season, one has been stolen, and several entirely disabled by falling trees and other accidents. Only three, the cutter used by Mr. Ockerson, a skiff used by Mr. Eisenmann, and another used by Mr. Marr, are reported fit for further use.

It is proper to say here that none of the small boats yet used have proved entirely satisfactory. The cutter is too large and heavy, and the ordinary skiff too small and

hard to handle. A boat in size and weight somewhere between the skiff and the cutter should be designed for this work, and a sufficient number built for use during the coming season.

Instruments.—Of the six instruments used on triangulation, the Repsold No. 1 and P. & M. No. 1323 were loaned; the remaining four, the Wiird. Gambey No. 1, Gambey 6-inch No. 2, T. & S. 12-inch No. 2, and 10-inch Gambey No. 1, were transferred by you.

The Repsold, P. & M., 6-inch Gambey, and Wiird. Gambey were carefully compared at the beginning of the work, and the results reported to you. The T. & S. and 10-inch Gambey were not compared with the other instruments.

These instruments are all reported in good condition except the 10-inch Gambey, which, as you are already aware, was knocked off of a center-post on to the platform, and its plate slightly sprung. Mr. Marr reported that it worked easily after the accident, and that the only visible effect was a difficulty in reading, owing to the verniers being slightly out of the plane of the graduated limb. It is noticed now, however, that the instrument does not turn freely, and it will be necessary before using again to send it to a maker for repairs.

It will be necessary during the summer to secure a location for instrumental work, to obtain the constants of the new instruments, and I hope at the same time to compare the 10-inch Gambey with the T. & S. or Repsold.

So far as an inspection of the work goes, the performance of all the instruments seems satisfactory.

Mr. Blunt informs me that the Wiird. Gambey seemed to have unruly spells at times, and for a day or two could not be worked with nearly as small range as ordinarily. The final results of such angles, however, seemed to indicate work of the usual accuracy. The same gentleman, during a part of the work, inadvertently departed from the programme laid down for Wiird. Gambey. The instrument is a repeating one, and instead of turning the vernier plate 180° at the time of reversing the telescope, he obtained a corresponding result by loosening the lower clamp and turning the entire instrument. I have roughly compared the two methods, and am of the opinion that the object of the programme, the elimination of instrumental errors, is not affected by the change.

If further investigation should indicate the contrary, the requisite corrections can be deduced by reading test angles, and applied.

The pocket sextants supplied to the triangulation parties for pioneering are excellent instruments, and have proved extremely useful.

One of the instruments furnished the topographical party, Wiird. 153, is reported as needing a general overhauling, and possibly renewing of some of the small parts. The other instruments, transits and levels, are in good condition.

The sextants used last season have been returned to Major Suter, but there are two in the office belonging to the Commission which can be issued instead.

Organization and methods.—The pioneering and observing forces of the triangulation parties were not evenly balanced. The two observers were not occupied much more than half of the available time. It was found that the rate of cutting was not proportionally increased by increasing the number of men, and therefore the attempt to keep the instruments busy by enlarging the force of axmen was not successful.

The necessity which arose of having parties alternate on short reaches was also a source of delay, since, on beginning work, the observers had to wait for the pioneers to start, and, on closing, the latter had to wait for the former to finish.

It is estimated that there were several days thus lost on each reach. Time is also lost in going to and from work, when prevalence of bad weather has placed the observers some distance in rear of the pioneers. This, in the winter season, is of but little importance, as the pioneers go down stream to their work, and after they are stopped by darkness, between 4 and 5 p. m., there is time to reach the boat by 6.

Mr. Ockerson, in a communication to which attention is respectfully invited (G—1469), proposes to effect the desired result, by dividing the party into two. He informs me, however, that in the light of data obtained since he submitted his plan, he would not now recommend it. I refer to it because it contains other suggestions which I consider valuable, and to which reference will presently be made.

The result desired seems to be to equalize the work of the pioneers and observers by increasing the speed of the former without correspondingly increasing the cost. In this light a suggestion made by Mr. Colby is of value.

Under the present organization the lines are not located with sufficient exactness to make it safe to commence cutting at both ends to meet in the middle. In this way six choppers can be advantageously employed on a line, but above that number the cost increases much faster than the speed. If the lines were carefully located, two such parties could be employed on the same line, and by doubling the number of axmen the progress would be nearly doubled. A recorder can superintend two such parties working in opposite directions from a station, whereas now he is only partially occupied by one, but prevented from doing anything else.

To effect this change in the method of working I would respectfully suggest the following organization for a party of two instruments:

One chief to personally reconnoiter and locate the lines; two assistants to read the angles; four recorders, two to superintend cutting parties, two with observers; one steward, one cook, two chainmen, thirty axemen, one engineer, one fireman, one steersman.

A launch would be needed to carry the chief from point to point, and to bring in parties at night. She would not have time to pick up stations, and, as suggested by Mr. Ockerson, the services of a squad of men might be necessary to build stations where timber is convenient, the portable ones being used on sand bars and like places. Three laborers are now necessary on the launch to move the portable stations, and if the plan of building stations were adopted, these same men, with two more to help them, would probably be able to keep up with the work.

As nearly as I can estimate, the cost of such a party would exceed by 25 per cent. that of the present parties, while the increase of progress would be from 75 to 100 per cent.

In addition, the parties should be so located as to make the season's work continuous.

The organization of the topographical party seems to have been satisfactory, and with proper supervision I believe such a party can do economical work. For this party the rate of progress depends largely upon the executive ability displayed by the chief.

While all the work has proved satisfactory, I think the left bank levels, run by Mr. Ferguson, deserving of particular mention for their accuracy, as shown by the comparison with the precise levels, taken in connection with the rapidity of the work. The levelers were crowded to the utmost all the time, and it would be well if a very little more work could be given to the transitmen, so as to equalize their work with that of the levelers.

It was found necessary during the past season to dispense with the elevations of the two reference-stones farthest from the river in each line in order to keep the levelers up.

Progress and cost.—Although the progress of none of the parties, except perhaps the precise levels, was as rapid as was expected, the failure in this respect is in part explained by the extremely unfavorable weather and stage of water which prevailed during the season. The effect of the weather upon the progress of triangulation is apparent from a comparison of the work in December and February, representing respectively the worst and best conditions met with. The parties of Assistants Ockerson and Eisenmann made, respectively, 25 and 28 miles in the former, and 39 and 40 miles during the latter month. The figures for February would have been largely increased could the lines have been opened fast enough.

The total distance covered by the triangulation parties is as follows:

	Miles.
By the party of Assistant Ockerson	151
By the party of Assistant Eisenmann	132
By the patty of assistant Marr	39
Total	319

The difference of 19 miles between Messrs. Ockerson and Eisenmann is partly due to the time spent in comparison of instruments, which slightly advanced Mr. Ockerson's work, but not the other, and the time spent by Mr. Eisenmann at Tiptonville, beginning work which was finished by Mr. Marr. Although his party made less progress in miles, Assistant Eisenmann reports 174 stations occupied, from which 516 angles were measured, as against 152 stations, and 426 angles reported by Mr. Ockerson. The latter averaged one station per mile, the former about 4 stations in 3 miles. It would seem that the method of working, by alternating over short reaches of river, should eliminate effects due to locality, and make this difference largely depend upon the way in which the lines were located.

The cost of these two parties while in the field was almost identical, being for Mr. Ockerson's party $10,727.35, and for Mr. Eisenmann's party $10,716.60. Divided by the corresponding number of miles, these amounts give for the field cost per mile of the work of the parties in question, $71 and $81, respectively.

If the latter party had covered as much ground in proportion to the number of stations occupied as the former, the cost per mile of its work would have been reduced to $62, as against $81, its actual cost. These figures strongly indicate that more talent and time devoted to systematic location of lines would be in the interest of economy, by causing the same work to cover more ground, and this adds strength to the conc usion already reached respecting scientific pioneering. It will not only enable a party to do more work, in proportion to its cost, but will cause the work done to include a greater length of river.

The 36 miles executed by Mr. Marr cost considerably more than the above, his field expenses reaching a total of $5,347.45, or $148 per mile.

This increased cost is partly due to the short season, which required the same expenses of fitting out and laying up as the longer ones did.

But the principal cause is to be found in the slower progress of the party, being about 14 miles per month, or about one-half that of the other parties during the same months.

The field expenses of the topographical party were $15,591.01 or $65 per mile.

This party in particular was delayed by the high stage of water. In addition to the delay, the character and value of its work were seriously affected from the same cause.

I think that the cost of this work may safely be assumed as the outside limit in future estimates.

The field-work of the leveling party not being complete at this date, it is only referred to in order to complete the subject, and if found necessary a special report will be made upon it.

The cost of the field-work of this party may be closely estimated at $8,400, and the distance which it will accomplish, at 300 miles; giving $28 per mile as the approximate cost of this season's work.

From Plum Point to Memphis the high-water interfered with the progress of the work, and three short stretches were covered with water to so great a depth that they had to be passed.

Assistant Frost, with a recorder, was detached at Memphis, to return and fill in these breaks. This not only delayed the work, but involved it in from $150 to $200 extra expense. I think that the figure stated, $28 per mile, will cover the cost of field-work under the most unfavorable circumstances that are likely to arise.

We have, then, taking the triangulation at $76 per mile, a mean of Assistants Ockerson and Eisenmann's work, for the cost per mile of the completed survey, $169.

For energy, integrity, and devotion to the interests of the work, I can speak in the highest terms of Messrs. Ockerson, Eisenmann, Marr, and Paige. Of their success the results of their work, as above stated, form the best criterion.

The assistants and recorders of the triangulation parties are highly commended by their respective chiefs.

Mr. Paige's report will not be in until his work is ended, but there is every indication of efficiency on the part of his officers.

To the peculiar fitness and the faithfulness of the subordinate officers of the topographical party the success of that part of the work is largely due.

Respectfully submitted.

SMITH S. LEACH,
First Lieutenant of Engineers, Secretary.

General C. B. COMSTOCK,
Chairman of Committee on Surveys and Examinations.

SAINT LOUIS, *July* 6, 1881.

GENERAL: I have the honor to submit the following report upon the field-work of the surveys during the fiscal year just ended.

Outfit.—All boats, &c., in the possession of the Commission have been kept in serviceable order by the necessary slight repairs from time to time.

The sinking of the survey-boat Hampton, at the instance of an officer of the National Board of Health, and by authority of the honorable the Secretary of War, and the extensive repairs to the hull of the Missouri, are the only changes in that part of the outfit. The survey-boats Nos. 1 and 2, formerly used by the topographical party, are no longer fit for such use, and will be turned over to Lieutenant Marshall for store-boats at the first opportunity.

There are two boats now at Mound City which are in still worse condition, and can best be disposed of by turning them into the construction depot at that place for use as store-boats. Several skiffs have been destroyed and condemned, and the necessary number for use has been kept filled by purchase.

The launch Irene has been returned to Captain Mackenzie, at his request. The tug Mignon has been kept in order by slight repairs. The Frolic, the counterpart of the Mignon, but a much superior boat, has been purchased. The Rosebud has been chartered, with privilege of purchase. The Mignon and the survey-boat Missouri are now temporarily in possession of Captain Ernst.

Instruments.—No accidents have happened to instruments during the year, except the breaking of a level-tube, and those on hand at last report are in good condition, except as therein mentioned. Two 10-inch T. & S. theodolites and five Kern levels with rods have been received during the year. One of the former and two of the latter have been in use, and have given the most complete satisfaction.

Organization and methods.—In the large system of triangulation from bluff to bluff, which comprises nearly all the work done last year, the defect in organization noticed

in last report disappears. In fact, the party becomes a number of parties, working separately and independently, and the aggregate strength is determined by the necessity of making each branch self-supporting.

On account of the large size and small number of the triangles, the work of computing is greatly lessened, and Mr. Ockerson was able to do with three recorders. Mr. Eisenmann is now working with two.

The high points occupied diminish the amount of cutting required, which enables the number of laborers to be decreased. An item of considerable expense in this work is the transportation of men and instruments to, from, and between inland stations. Farmers with their teams have to be depended upon, and during their busy season it is difficult to get the transportation even at almost exorbitant prices.

Additional experience confirms my opiuion that the organization of the topographical party is efficient for the original scope of the work. What modifications the recent changes in the instructions will require, it is difficult to say, but I think the addition to the party of two recorders, or assistant engineers of the lowest grade, to be occupied in general instrumental work and reconnaissance, would be quite sufficient.

The organizations of parties for precise and trans-alluvial levels and slope are so simple as to require no discussion. They have proved efficient and satisfactory, and no changes are recommended.

Progress and cost.—The estimates for the triangulation, leveling, and topography, projected last year, were based on the cost of the previons work, and they have proved sufficient, notwithstanding the unusualy early and severe winter, during which a part of the work was done. Had average weather prevailed, the estimates, particularly for triangulation and levels from Illinois to Ohio rivers, would have been largely in excess. The triangulation just mentioned covered about 245 miles of river. Its total field cost was $12,491.16, being $51 per mile. The best conditions prevailed during the month of October, and 50 miles of the river were covered. This rate of progress corresponds to a cost of $40 per mile.

The average closure on this work was about two seconds. Omitting the small triangles used in coming off of the base, the minimum side was about $\frac{7}{10}$ of a mile, and the maximum 14 miles. The total number of stations was 107, being one in $2\frac{1}{3}$ miles of river.

The triangulation from Prentiss to Greenville, executed by Mr. Wisner, is particularly instructive. The methods pursued were identical with the previous work on the lower river. The party was somewhat differently constituted, having but one instrument and no launch.

The absence of one observer and two recorders, and the launch and crew, corresponded to a saving of $556 per month in the cost of the party.

The laboring force for this party was nearly as large as for the double parties, and the monthly rate of progress was about the same; the absence of steam power not seeming to affect perceptibly the amount of work accomplished by a given force in pioneering.

The figures for this work are as follows:

Number of miles of river covered	81
Number of stations occupied	95
Number of angles read	360
Average closure	1″.86
Average monthly rate of progress—miles	25
Total field cost	$3,900
Cost per mile of actual triangulation	62
Cost per mile of river covered	48

The average cost per mile of the previous year's triangulation was $76.

After making due allowance for the large experience of Mr. Wisner in similar work, and the conspicuous energy and skill with which he prosecuted the work in question, other reasons must be sought for this reduction of cost, and seem to be foreshadowed in the facts that the pioneers were able to make progress proportional to their numbers without the aid of steam power, and half the observing force formerly employed was able to keep up with them, also without steam power.

The balance which the first year's parties had vainly attempted to obtain by increasing the pioneering force was in this case the natural result of reducing the observing force.

Mr. Wisner is of the opinion that a launch would have paid for itself in this work, but this seems to me exceedingly doubtful.

Precise levels.—The double party, in charge of Assistant Paige, carried a line from Grafton to Cairo, keeping, as far as possible, along the bluffs, and in this way succeeded in covering the 245 miles of river with 212 miles of line. The total field cost was $8,065.83, being $38 per mile of line and $33 per mile of river.

This party was also seriously retarded by the severe winter. For nearly two months their boat was fast in the ice, and one half of the party remained on board to take

care of it, while the other half was sent below to prosecute the work as best they could.

The average rate for the season was 35 miles per month. The best work was done in September and October, an average rate of 43 miles per month being maintained. At this rate the cost per mile of line would be $31.

The work done from Prentiss to Greenville, by Assistant Johnson, was under more favorable conditions, although he reports but 37 out of 72 as days upon which work could be done. This line was run with a single instrument. Its length was about 45 miles, covering 81 miles of river.

Its total field cost was $2,094.10, being $46 per mile of line. The cost per mile of river would be misleading, since the counterpart of the Greenville bends is not likely to be met with.

The excessive cost of this work is in part attributable to the short season, and the distance of the work from the fleet, which somewhat increased the expense of fitting out and laying up the party. At the same time, it nearly or quite demonstrates that the work cannot be economically prosecuted with a single instrument.

The progress of the topographical party was seriously retarded by the shortness of the season, the high-water which prevailed, and the break made in the work to take up the Vicksburg survey.

The total cost of the party was	$13,391 70
Less cost of Vicksburg survey	4,267 50
Cost of regular work	9,124 20

Of the latter there were 89 miles accomplished, together with soundings and the location of reference stones, from Austin to Delta, 25 miles, the reach having already been surveyed by General Comstock.

These 25 miles Mr. Ockerson estimates as equal to 18 miles of full work. Accepting this estimate, the work done amounts to 107 miles, and the cost is per mile $85.

The last 40 miles was accomplished in 20 days, or at the rate of 2 miles per day. Mr. Ockerson believes 50 to 60 miles per month can be made under average conditions.

The party of Assistant E. S. Davis accomplished 50 miles of trans-alluvial levels in 143 days with a total expenditure of $2,737.69. This was done under unfavorable circumstances, and the rate can be maintained if not exceeded. The allotments made should complete the work.

The work accomplished by Assistant Hider's party can scarcely be measured in any unit, and it is perhaps from this cause that its actual cost was underestimated in making the allotment for the work.

The time occupied in the work was 192 days, and its cost $5,145.86, or $27 per day.

The time spent in different parts of the work, with corresponding cost, is approximately as follows:

Low-water slope, 50 days	$1,350
High-water marks, 95 days	2,565
Gauges, 20 days	540
Bases, 20 days	540

Slope was obtained from Cairo to Commerce, 300 miles, and high-water marks of 1880 and previous years, from Cairo to the Forts.

I will merely mention here, what I hope to treat more fully in a special report—the unprecedented smallness of discrepancy in the results obtained in measurements with the steel tape.

The Cairo base and four triangle sides were measured by Mr. Hider; two bases were measured by Assistant Eisenmann, and one by Assistant Ockerson. The measurements were in duplicate, and, reduced to standard temperature, the discrepancies were:

Hider	Cairo base	1 in	33,000	
	First △ side	1 in	40,000	
	Second △ side	1 in	180,000	
	Third △ side	1 in	104,000	
	Fourth △ side	1 in	333,000	
Eisenmann	La Croix base	1 in	218,000	
	Keokuk	1 in	200,000	Approx.
Ockerson, Grafton		1 in	59,000	

All the assistants in charge of parties have rendered faithful and efficient service, and they speak in high terms of their subordinates.

I venture the hope that in case this committee is obliged to dispense with the serv-

ices of any of its present employés, it may see fit to commend them to the Committee on Construction as worthy of further employment.

Very respectfully, your obedient servant,

SMITH S. LEACH,
First Lieutenant of Engineers, Secretary Mississippi Commission.

General C. B. COMSTOCK,
Chairman of Committee on Surveys and Examinations.

APPENDIX B.

FINAL REPORT OF A SECONDARY TRIANGULATION OF THE MISSISSIPPI RIVER BETWEEN CAIRO, ILL., AND MEMPHIS, TENN., EXECUTED UNDER THE ORDERS OF THE MISSISSIPPI RIVER COMMISSION, 1879–'80.

OFFICE MISSISSIPPI RIVER COMMISSION,
2828 *Washington Avenue, Saint Louis, Mo., November* 23, 1881.

GENERAL: I have the honor to submit herewith a memorandum, compiled from the records of this office, relative to the secondary triangulation from Cairo to Memphis, accompanied by the results in tabular form, a sketch of the system, and a report of Assistant G. Y. Wisner upon the final adjustment, the whole intended to form a final report upon this portion of the work.

Very respectfully, your obedient servant,

SMITH S. LEACH,
First Lieutenant of Engineers, Secretary.

General C. B. COMSTOCK,
Chairman Committee on Surveys and Examinations, Detroit, Mich.

I. The system is composed of 222 stations situated on or near the banks of the river. They are connected by 10 quadrilaterals and 199 single triangles.

II. The work depends on the following known lines:

1. The side, Island No. 1, Mabee (Stations 1 and 2). This line was furnished from the office of the Lake Survey. It depends for length and azimuth on the Cairo Secondary Base, and for the co-ordinates of its extremities on the Cairo astronomical post. It is the twelfth side (in the order of computation) from the base. (For description of base and triangulation, see Report of Chief of Engineers, 1877, Part 2, p. 1196.)

The length of the side is 1838.508 meters.

2. The line Barton—Frame Chute (Stations 221, 222), from the same source.

Length and azimuth from the Memphis Base, co-ordinates of extremities from the Memphis astronomical post. It is the fourteenth side (in order of computation) from the base.

Its length is 3669.60 meters.

(For description of base, &c., see Report of Chief of Engineers, 1878, Part III, pp. 1370–1381.)

3. The Cottonwood base, midway between the above (Stations 119, 120). It was measured with secondary apparatus, in 1880, by a party of the Coast and Geodetic Survey.

Its length, as furnished from the Coast and Geodetic Survey Office, is 1619.9591 meters. Azimuth, north base to south base, $46^\circ\ 24'\ 56''.98 \pm 0.57$.

4. The following triangle sides, which were measured in duplicate with steel tape in the winter of 1880–'81:

1st. △ Compromise — △ State Line (Stations 67–70), length 3463.729 meters.
2d. △ Fletcher — △ Id. 28 (Stations 154–156), length 2573.136 meters.
3d. △ Craighead — △ Lanier (Stations 166–167), length 2108.531 meters.
4th. △ Id. 35 — △ Cole (Stations 180–182), length 3115.744 meters.

These lines were measured with a steel tape, 299 feet in length 0.109 inch in width, and 0.018 inch in thickness. It was stretched over a line of stakes 25 feet apart, driven to grade. The end or marking stakes were made very firm, and the mark was made on a copper tack driven in the end of the stake. Uniform tension was obtained by fastening a wire to the forward end of the tape, which, passing over a pulley on an auxiliary stake, supported a spring-balance and a weight.

The length of the tape was determined by a duplicate measurement of the Cairo Base.

The weight used was 12 pounds.

The coefficient of expansion was assumed the same as that of a steel bar. The value, taken from Lee's tables, is 0.00000636, log = 4.8034577.

The tape was found to be of standard length at a temperature of 43°.13 F.

The data derived from these measurements are given in the following table:

Line.	First measurement.		Second measurement.		Reduced to standard temperature.		Discrepancy.
	Length.	Temperature.	Length.	Temperature.	First measurement.	Second measurement.	
	′	°	′	°	′		
Cairo Base*	5401.950	67.34	.868	70.83			
Side (67–70)	11364.846	30.0	.930	32.9	11363.892	4.198	.306
Side (154–156)	8443.588	16.8	.673	13.4	8443.128	3.121	.007
Side (166–167)	6918.365	29.8	.079	37.9	6917.779	.849	.970
Side (180–182)	10222.996	33.0	3.006	32.9	10222.337	2.342	.005

*Length of base by second tubes, 5402.861.

The reduction to sea-level, which would average about half an inch for these lines, was considered within the probable error of the measurements, and was not applied.

III. The instruments used were the following:

Repsold universal instrument No. 1. Diameter of horizontal limb 12 inches. Limb graduated to 4 feet reads by two microscopes to 2 inches. Angles measured in order around the station, positive and negative, direct and reversed. Eight sets were taken uniformly distributed over the limb, giving sixteen pointings at each station.

Troughton and Simms No. 1. Diameter of horizontal limb 12 inches. Limb graduated to 5 feet reading by two microscopes to 1 inch. Programme same as for Repsold.

Gambey No. 1. Diameter of horizontal limb 10 inches. Limb graduated to 5 feet reading by *verniers* to 5 inches. Programme same as the Repsold, except that 12 sets, giving 24 pointings, were taken.

Gambey-Würdemann No. 1. Diameter of horizontal limb, 10 inches. Limb graduated to 5 feet, reading by *verniers* to 5 inches. Programme same as for Gambey No. 1.

Gambey No. 2. Diameter of limb, 6 inches. Limb graduated to 10 feet, reading by *verniers* to 10 inches. Single angles read in repetitions of threes. Readings positive and negative, direct and reversed. Six sets, uniformly distributed over the limb, and giving 36 pointings at each station were taken.

Pistor & Martin universal instrument. Diameter of limb, 5 inches. Limb graduated to 10 feet, reading by two microscopes to 10 inches (single seconds estimated).

Angles read in order around the station, positive and negative, direct and reversed. Six double sets, at intervals of 30°, giving 24 pointings at each station, were taken.

None of the instruments closed the horizon. The limit of closure of triangles was six seconds.

The instruments were mounted on portable tripods made of scantling, framed, and bolted together. They were 6, 8 and 12 feet in height, the former being very seldom used.

The observer stood on a platform disconnected from the instrument support.

The stations were marked by stones 3 feet in length, dressed to 6 × 6 inches at one end, the balance rough. A small hole was drilled in the top. They were planted vertically, the top projecting but a few inches above ground.

The targets were octagonal poles, of 1½ inches diameter for the upper and 3 inches for the lower part of the work. They were covered with zones of black and white cloth. A nail in the bottom was set into the hole in the top of the stone, and the target was then plumbed.

When the station was occupied, the target was removed and reset before leaving.

The verticality of the target was tested when the station was visited for the purpose of removing the tripod.

IV. For the preliminary reduction, single triangles were adjusted to closure, side equations being neglected. The lengths and azimuths of sides were then computed from Cairo to Cottonwood Base, and from thence to Memphis. The discrepancies were:

From—	To—	Distance.	Number of triangles.	Discrepancies.	
				In length.	In azimuth.
		Miles.			″
Cairo	Cottonwood	120	122	1 in 2650	08.00
Cottonwood	Memphis	120	103	1 in 1830	00.59

The final reduction was made separately for each of the six sections into which the work was divided by the seven known lines before enumerated. It consisted of a least square adjustment with angle equations, and equations which made the computed lengths of bases agree with their measured lengths, the method of correlates being used.

When completed, the geodetic co-ordinates were computed from Cairo and Memphis to Cottonwood as before.

The final discrepancies are as follows:

	Latitude north base.	Longitude north base.	Azimuth.
	° ′ ″	° ′ ″	° ′ ″
From observations at north base			46 24 56.98
Computed from Memphis	36 04 13.75	89 40 52.03	46 24 56.70
Computed from Cairo	36 04 13.65	52.71	47.61

A special report on this reduction, prepared by Assistant G. Y. Wisner, who made the computation, is appended. The following tables give the results of the work:

Tabulated results of secondary triangulation from Cairo to Memphis.

No.	Stations.	Observed angles.	Corrected angles.	Distance.	Azimuth.	Latitude.	Longitude.
		° ′ ″	″	*Miles.*	° ′ ″	° ′ ″	° ″ ″
1	Maybee	43 03 51.54	50.76	1,838.50	*312 01 06.02	*36 56 59.710	*89 06 55.540
2	Island No. 1	99 21 55.01	54.61	2,058.84	32 39 44.56	*36 56 19.790	89 06 00.340
3	Norfolk	37 34 15.36	14.63	2,975.03	175 05 02.97	36 55 23.558	89 06 45.234
		01.91	00.00				
2	Island No. 1	39 34 52.79	51.30	2,058.84	32 39 44.56		
3	Norfolk	93 47 30.48	28.65	1,804.67	306 26 46.24		
4	Chute	46 37 43.69	40.05	2,826.12	173 05 01.52	36 54 48.778	89 05 46.588
		06.96	00.00				
3	Norfolk	58 05 54.10	55.77	1,804.67	306 26 46.24		
4	Chute	73 35 55.70	56.64	2,051.92	52 51 24.83		
5	Beckwith	48 18 07.07	07.59	2,318.63	184 32 37.55	36 54 08.580	89 06 52.653
		56.87	00.00				
4	Chute	39 09 49.66	51.42	2,051.92	52 51 24.83		
5	Beckwith	82 18 31.36	32.62	1,519.41	315 09 17.77		
6	Davidson	58 31 33.20	35.96	2,384.22	193 41 19.75	36 53 33.630	89 06 09.380
		54.22	00.00				
5	Beckwith	74 11 38.14	36.85	1,519.41	315 09 17.77		
6	Davidson	70 07 22.44	20.52	2,506.29	65 02 23.23		
7	Cypress	35 41 02.19	02.63	2,449.59	209 20 25.52	36 52 59.311	89 07 41.135
		02.77	00.00				
6	Davidson	35 32 02.46	00.41	2,506.29	65 02 23.23		
7	Cypress	43 53 24.31	24.62	1,481.78	288 54 52.77		
8	Putney	100 34 36.82	34.97	1,767.59	209 30 01.72	36 52 43.725	89 06 44.533
		180 00 03.59	00.00				
7	Cypress	76 28 10.77	10.74	1,481.78	288 54 52.77		
8	Putney	64 19 54.87	54.66	2,279.48	44 35 32.08		
9	Campbell	39 11 54.99	54.60	2,113.18	185 22 58.71	36 51 51.061	89 07 49.140
		180 00 00.63	00.00				
7	Cypress	33 50 06.15	06.05	2,113.18	5 23 03.51		
9	Campbell	41 12 59.77	59.26	1,217.84	144 09 59.45		
10	Irene	104 56 55.40	54.69	1,441.16	219 12 47.48	36 52 23.089	89 08 17.927
		180 00 01.32	00.00				

*The length and azimuth of the line Maybee–Island No. 1 and the co-ordinates of extremities were furnished by the United States Lake Survey, and are assumed as correct.

Tabulated statement of secondary triangulation from Cairo to Memphis—Continued.

No.	Stations.	Observed angles.	Corrected angles.	Distance.	Azimuth.	Latitude.	Longitude.
		° ′ ″	″	*Miles.*	° ′ ″	° ′ ″	° ′ ″
9	Campbell	97 48 45.53	46.06	1,217.84	144 09 59.45		
10	Irene	46 38 54.03	54.31	2,075.75	10 48 36.49		
11	Island No. 2	35 32 19.49	19.63	1,523.53	226 20 46.69	36 51 16.946	89 08 33.642
		179 59 59.05	00.00				
10	Irene	33 53 08.62	09.76	2,075.75	10 48 36.49		
11	Island No. 2	49 32 59.72	60.71	1,164.96	141 15 26.35		
12	Willow	96 33 47.54	49.53	1,590.01	224 41 19.16	36 51 46.421	89 09 03.075
		179 59 55.88	00.00				
11	Island No. 2	52 27 42.34	43.08	1,164.96	141 15 26.35		
12	Willow	86 38 02.66	04.14	1,410.76	47 53 12.83		
13	Obrien	40 54 12.15	12.78	1,776.07	268 47 00.28	36 51 15.729	89 09 45.320
		179 59 57.15	00.00				
11	Island No. 2	60 33 27.98	27.93	1,776.07	88 47 43.27		
13	Obrien	55 46 05.20	05.14	1,725.66	324 33 05.42		
14	Island No. 3	63 40 27.20	26.93	1,638.31	208 13 56.58	36 50 30.122	89 09 04.926
		180 00 00.38	00.00				
13	Obrien	61 35 12.73	12.86	1,725.66	324 33 05.42		
14	Island No. 3	84 26 19.09	19.84	2,716.06	60 07 09.81		
15	Fan	33 58 28.17	27.30	3,073.52	206 07 45.52	36 49 46.216	89 10 39.958
		179 59 59.99	00.00				
14	Island No. 3	57 48 56.03	56.26	2,716.06	60 07 09.81		
15	Fan	66 09 12.92	11.67	2,771.73	306 15 24.50		
16	Parsons	56 01 53.28	52.07	2,995.38	182 18 10.64	36 48 53.029	89 09 09.784
		180 00 02.23	00.00				
15	Fan	29 49 16.39	15.52	2,771.73	306 15 24.50		
16	Parsons	63 32 48.41	47.26	1,380.74	62 43 31.29		
17	Lucas	86 37 58.39	57.22	2,485.81	156 05 04.39	36 48 32.500	89 09 59.294
		03.19	00.00				
16	Parsons	84 07 23.83	25.57	1,380.74	62 43 31.29		
17	Lucas	59 17 24.17	25.04	2,304.39	302 00 26.66		
18	Cannon	36 35 10.52	09.39	1,991.71	158 36 23.28	36 47 52.870	89 08 40.472
		179 59 58.02	00.00				
16	Parsons	34 53 08.34	08.61	1,991.71	338 36 05.72		
18	Cannon	67 01 18.75	16.13	1,164.19	225 37 39.41		
19	William	78 05 37.82	35.26	1,873.98	123 43 34.78	36 48 19.279	89 08 06.902
		180 00 04.91	00.00				
18	Cannon	76 03 44.48	46.14	1,164.19	225 37 39.41		
19	William	68 54 44.39	44.78	1,968.74	336 43 14.74		
20	Tyler	35 01 28.02	29.08	1,892.61	121 42 04.45	36 47 20.610	89 07 35.520
		179 59 56.89	00.00				
19	William	300 54 20.15	19.04	1,968.74	336 43 14.74		
20	Tyler	120 00 02.63	02.16	2,079.57	276 43 35.70		
21	Iron Bank	29 05 40.91	38.80	3,506.38	125 50 04.39	36 47 12.700	89 06 12.227
		180 00 03.69	00.00				
20	Tyler	54 59 29.12	27.18	2,079.57	276 43 35.70		
21	Iron Bank	74 25 45.68	43.79	2,204.87	22 18 41.79		
22	Fort Halleck	50 34 51.09	49.03	2,593.15	151 43 32.54	36 46 06.526	89 06 45.979
		05.89	00.00				
20	Tyler	30 44 47.18	47.86	2,593.15	331 43 02.88		
22	Fort Halleck	79 37 48.38	48.80	1,414.23	72 05 43.74		
23	Belmont	69 37 22.98	23.34	2,721.07	182 27 47.92	36 45 52.418	89 07 40.238
		179 59 58.54	00.00				

Tabulated results of secondary triangulation from Cairo to Memphis—Continued.

No.	Stations.	Observed angles.	Corrected angles.	Distance.	Azimuth.	Latitude.	Longitude.
		° ′ ″	″	*Miles.*	° ′ ″	° ′ ″	° ′ ″
22	Fort Halleck	58 10 26.62	27.10	1,414.23	72 05 43.74		
23	Belmont	87 49 44.22	44.61	2,149.00	339 54 55.87		
24	Thorn	33 59 48.13	48.29	2,527.45	193 55 01.97	36 44 46.941	89 07 10 490
		170 59 58.97	00.00				
23	Belmont	39 32 60.83	59.25	2,149.00	339 54 55.87		
24	Thorn	110 58 33.96	32.20	2,781.03	48 56 41.47		
25	Wolf Island	29 28 30.50	28.55	4,078.13	199 27 22.36	36 43 47.678	89 08 35.006
		180 00 05.29	00.00				
24	Thorn	30 19 09.58	10.64	2,781.03	48 56 41.47		
25	Wolf Island	106 50 45.83	46.62	2,064.97	335 46 37.53		
26	Muscavalley	42 50 02.11	02.74	3,914.95	198 37 00.70	36 42 46.584	89 08 00.869
		179 59 57.52	00.00				
25	Wolf Island	36 42 04.48	04.33	2,064.97	335 46 37 53		
26	Muscavalley	87 49 15.35	14.99	1,497.88	67 57 42.95		
27	Gale	55 28 41.15	40.68	2,504.50	192 28 28.83	36 42 28.347	89 08 56.809
		180 00 00.98	00.00				
26	Muscavalley	48 04 44.34	44.81	1,497.88	67 57 42.95		
27	Gale	64 21 34.48	34.81	1,205.82	312 18 44.32		
28	Auxiliary	67 33 40.11	40.38	1,460.99	209 52 46.17	36 42 02.012	89 08 20.886
		179 59 58.93	00.00				
27	Gale	91 04 34.63	35.92	1,205.82	312 18 44.32		
28	Auxiliary	57 56 43.02	44.41	2,342.33	74 22 21.38		
29	Short Stop	30 58 38.64	39.67	1,985.58	223 22 47.40	36 41 41.532	89 09 51.754
		179 59 56.29	00.00				
27	Gale	44 03 38.44	39.34	1,985.58	43 23 20.24		
29	Short Stop	95 56 18.95	19.84	2,148.16	319 19 07.24		
30	Wiggins	40 00 00.10	00.82	3,072.42	179 19 41.77	36 40 48.680	89 08 55.358
		179 59 57.49	00.00				
27	Gale	30 13 06.35	07.67	3,072.42	359 19 40.90		
30	Wiggins	113 08 01.17	02.22	2,590.71	66 11 39.55		
31	Ferris Landing	36 38 49.27	50.11	4,733.50	209 31 52.44	36 40 14.745	89 10 30.810
		179 59 56.79	00.00				
30	Wiggins	47 22 54.54	54.46	2,590.71	66 11 39.55		
31	Ferris Landing	88 18 17.40	17.17	2.729.03	334 28 59.71		
32	Davis	44 18 48.75	48.37	3,706.90	198 48 16.35	36 38 54.844	89 09 43.482
		180 00 00.69	00.00				
31	Ferris Landing	36 37 51.25	52.98	2,729.03	334 28 59.71		
32	Davis	115 00 55.10	56.62	3,428.75	39 28 31.35		
33	Parker	28 21 09.17	10.40	5,207.46	191 06 28.58	36 37 28.974	89 11 11.211
		179 59 55.52	00.00				
32	Davis	31 46 16.77	16.64	3,428.75	39 28 31.35		
33	Parker	55 19 54.10	53.73	1,807.65	274 47 32.73		
34	Little Obrien	92 53 50.00	49.63	2,823.61	187 42 05.62	36 37 24.068	89 09 58.716
		180 00 00.87	00.00				
33	Parker	44 03 15.37	16.04	1,807.65	274 47 32.73		
34	Little Obrien	101 11 17.29	17.93	2,204.76	353 36 58.05		
35	Salmon Landing	34 45 25.59	26.03	3,110.50	138 51 37.89	36 36 12.984	89 09 48.852
		179 59 58.25	00.00				
33	Parker	41 13 09.71	09.57	3,110.50	318 50 48.77		
35	Salmon Landing	73 52 01.78	01.47	2,263.12	64 59 36.42		
36	Island No. 6	64 54 49.35	48.96	3,299.22	180 03 58 25	36 35 41.940	89 11 11.364
		180 00 00.84	00.00				

Tabulated results of secondary triangulation from Cairo to Memphis—Continued.

No.	Stations.	Observed angles.	Corrected angles.	Distance.	Azimuth.	Latitude.	Longitude.
		° ′ ″	″	*Miles.*	° ′ ″	° ′ ″	° ′ ″
35	Salmon Landing ..	33 25 51.04	52.40	2,263.12	64 59 36.42		
36	Island No. 6	104 52 40.08	41.21	1,874.64	349 51 28.43		
37	Bayou du chien ...	41 41 25.44	26.39	3,288.56	211 33 02.75	36 34 42.073	89 10 58.087
		179 59 56.56	00.00				
36	Island No. 6.....	32 32 20.72	22.40	1,874.64	349 51 28.43		
37	Bayou du chien ...	102 30 40.93	42.36	1,427.27	67 20 53.99		
38	Hickman.....	44 56 53.96	55.24	2,590.50	202 23 27.17	36 34 24.237	89 11 51.063
		179 59 55.61	00.00				
37	Bayou du chien ...	31 23 14.69	16.32	1,427.27	67 20 53.99		
38	Hickman.....	110 12 42.79	44.16	1,196.77	137 07 38.26		
39	Wasp	38 23 58.34	59.52	2,156.31	278 43 19.22	36 34 52.690	89 12 23.815
		179 59 55.82	00.00				
38	Hickman.....	64 47 53.96	54.44	1,196.77	137 07 38.26		
39	Wasp	84 51 51.14	51.63	2,143.89	41 59 10.37		
40	Bushart.....	30 20 13.71	13.93	2,359.91	252 18 49.94	36 34 00.988	89 13 21.491
		179 59 58.81	00.00				
38	Hickman.....	30 46 34.04	32.84	2,359.91	72 19 43.82		
40	Bushart.....	73 35 03.38	01.91	1,246 46	178 43 48.03		
41	Ballard.....	75 38 26.76	25.25	2,336.71	283 05 22.11	36 34 41.415	89 13 22.602
		180 00 04.18	00.00				
40	Bushart.....	93 33 17.62	17.87	1,246.46	178 43 48.03		
41	Ballard.....	56 04 26.56	26.91	2,460.59	54 48 14.28		
42	Keiser	30 22 15.23	15.22	2,045.63	265 09 41.32	36 33 55.397	89 14 43.465
		179 59 59.41	00.00				
40	Bushart.....	35 54 44.10	45.65	2,045.63	85 10 30.16		
42	Keiser.....	76 45 38.83	40.16	1,300,37	188 24 01.16		
43	Porter.....	67 19 32.92	34.19	2,158.05	301 04 31.52	36 34 37.131	89 14 35.824
		179 59 55.85	00.00				
42	Keiser	80 56 51.54	52.85	1,300.37	188 24 01.16		
43	Porter.....	69 03 32.24	33.60	2,568.92	77 27 39.31		
44	Warren	29 59 32.52	33.55	2,429.50	287 26 12.77	36 34 19.026	89 16 16.679
		179 59 56.30	00.00				
42	Keiser	34 08 49.38	49.84	2,429.50	107 27 08.31		
44	Warren	117 35 07.27	07.50	2,879.57	169 51 05.27		
45	Brown	28 16 02.71	02.66	4,546.83	321 34 50.43	36 35 50.983	89 16 37.092
		179 59 59.36	00.00				
44	Warren	26 12 41.75	43.41	2,879.57	169 51 05.27		
45	Brown	65 41 27.50	28.85	1,272.59	55 32 21.95		
46	French's Point	88 05 46.40	47.74	2,625.72	323 37 44.54	36 35 27.620	89 17 19.303
		179 59 55.65	00.00				
45	Brown	51 48 49.74	48.48	1,272.59	55 32 21.95		
46	French's Point	102 59 51.11	49.51	2,350.18	132 32 07.28		
47	Island No. 8	25 11 22.52	22.01	2,913.43	287 20 03.72	36 36 19.159	89 18 28.982
		03.37	00.00				
45	Brown	29 58 21.37	21.00	2,913.43	107 21 10.43		
47	Island No. 8.....	82 12 35.69	36.13	1,571.84	205 07 27.59		
48	Ray	67 49 03.05	02.87	3,117.26	317 18 40.72	36 37 05.327	89 18 02.125
		00.11	00.00				
47	Island No. 8.....	48 09 01.71	00.87	1,571.84	205 07 27.59		
48	Ray.....	99 45 16.53	15.55	2,203.63	124 52 59.16		
49	Saint James.....	32 05 44.80	43.58	2,915.54	336 57 59.34	36 37 46.206	89 19 14.882
		03.04	00.00				

Tabulated results of secondary triangulation from Cairo to Memphis—Continued.

No.	Stations.	Observed angles.	Corrected angles.	Distance.	Azimuth.	Latitude.	Longitude.
		° ′ ″	″	*Miles.*	° ′ ″	° ′ ″	° ′ ″
48	Ray	34 12 28.86	31.03	2,203.63	124 52 59.16		
49	Saint James	87 07 32.08	34.02	1,450.46	31 59 49.78		
50	Woodcock	58 39 53.10	54.95	2,576.69	270 39 26.28	36 37 06.299	89 19 45.812
		179 59 54.04	00.00				
49	Saint James	55 37 07.48	09.22	1,450.46	31 59 49.78		
50	Woodcock	88 08 53.46	55.20	2,025.30	123 50 36.13		
51	Hubbard	36 13 54.05	55.58	2,452.73	267 36 00.15	36 37 42.886	89 20 53.514
		179 59 54.99	00.00				
49	Saint James	32 44 11.61	11.66	2,452.73	87 36 59.00		
51	Hubbard	98 00 20.26	20.07	1,750.64	5 36 20.22		
52	Kase	49 15 28.60	28.27	3,205.71	234 51 44.40	36 36 46.364	89 21 00.396
		00.47	00.00				
51	Hubbard	37 45 04.74	04.63	1,750.64	5 36 20.22		
52	Kase	112 17 27.88	27.57	2,146.35	73 18 48.55		
53	Lovalle	29 57 28.38	27.80	3,243.77	223 20 31.40	36 36 26.362	89 22 23.121
		01.00	00.00				
52	Kase	35 18 10.23	12.08	2,146.35	73 18 48.55		
53	Lovalle	81 21 53.39	55.02	1,388.05	334 39 54.23		
54	Esley	63 19 51.35	52.90	2,374.64	218 00 01.39	36 35 45.662	89 21 59.226
		179 59 54.97	00.00				
53	Lovalle	43 52 46.88	46.80	1,388.05	334 39 54.23		
54	Esley	105 49 38.48	38.24	1,907.37	48 50 30.24		
55	Phillippo	30 17 35.47	34.96	2,647.44	198 32 20.84	36 35 04.933	89 22 56.991
		00.83	00.00				
54	Esley	28 41 31.40	33.14	1,907.37	48 50 30.24		
55	Phillippo	110 38 53.39	54.85	1,405.48	339 28 50.65		
56	Mitcham	40 39 30.73	32.01	2,739.36	200 08 34.48	36 34 22.228	89 22 37.177
		179 59 55.52	00.00				
55	Phillippo	45 54 09.52	07.99	1,405.48	339 28 50.65		
56	Mitcham	97 54 30.48	28.80	1,709.43	61 34 33.66		
57	Abbot	36 11 25.11	23.21	2,357.67	265 22 34.42	36 33 55.827	89 23 37.635
		05.11	00.00				
56	Mitcham	34 40 48.29	48.52	1,709.43	61 34 33.66		
57	Abbot	101 48 19.58	19.59	1,412.64	343 22 17.23		
58	Old J. B	43 30 52.04	51.89	2,430.18	206 53 18.81	36 33 11.914	89 23 21.381
		179 59 59.91	00.00				
57	Abbot	53 47 36.83	37.84	1,412.64	343 22 17.23		
58	Old, J. B	93 31 23.40	24.30	2,110.89	69 51 02.61		
59	Phillips Landing	32 40 57.20	57.86	2,611.12	217 09 17.30	36 32 48.318	89 24 41.056
		179 59 57.43	00.00				
58	Old J. B	46 58 14.31	14.41	2,110.89	69 51 02.61		
59	Phillips Landing	100 24 18.49	18.45	2,862.17	350 14 33.61		
60	Lester	32 37 27.14	27.14	3,851.00	202 52 12.37	36 31 16.805	89 24 21.561
		00.22	00.00				
59	Phillips Landing	31 34 48.13	47.60	2,862.17	350 14 33.61		
60	Lester	81 28 40.50	39.71	1,629.02	88 46 05.51		
61	Brier	66 56 33.54	32.69	3,076.33	201 48 53.85	36 31 15.664	89 25 27.020
		02.17	00.00				
60	Lester	84 10 02.48	04.40	1,629.02	88 46 05.51		
61	Brier	63 45 38.24	40.23	3,052.13	332 31 06.78		
62	Boom	32 04 13.70	15.37	2,751.88	184 35 55.83	36 29 47.815	89 24 30.429
		179 59 54.42	00.00				

Tabulated results of secondary triangulation from Cairo to Memphis—Continued.

No.	Stations.	Observed angles.	Corrected angles.	Distance.	Azimuth.	Latitude.	Longitude.
		° ′ ″	″	*Miles.*	° ′ ″	° ′ ″	° ′ ″
60	Lester	29 21 09.71	10.91	2,751.88	4 36 01.11		
62	Boom	78 22 09.68	10.60	1,416.15	106 13 45.23		
63	Birdsall	72 16 37.61	38.49	2,829.67	213 56 34.24	36 30 00.652	89 25 25.066
		179 59 57.00	00.00				
62	Boom	88 57 01.02	03.01	1,416.15	106 13 45.23		
63	Birdsall	53 39 41.02	43.12	2,331.88	339 52 55.85		
64	Kentuck	37 23 12.08	13.87	1,878.73	197 16 28.89	36 28 49.614	89 24 52.846
		179 59 54.12	00.00				
62	Boom	44 41 03.06	02.85	1,878.73	17 16 42.22		
64	Kentuck	102 07 17.33	16.96	2,413.08	95 09 11.93		
65	Donaldson	33 11 40.80	40.19	3,355.07	241 56 34.33	36 28 56.635	89 26 29.393
		01.19	00.00				
64	Kentuck	67 32 33.88	33.45	2,413.08	95 09 11.93		
65	Donaldson	75 42 55.15	54.65	3,727.88	350 51 09.18		
66	Tennessee	36 44 32.60	31.90	3,909.07	207 35 55.24	36 26 57.230	89 26 05.594
		01.63	00.00				
65	Donaldson	87 36 23.80	23.83	3,727.88	350 51 09.18		
66	Tennessee	42 15 21.65	21.85	4,852.42	128 36 01.48		
67	Grampus	50 08 14.42	14.32	3,265.83	258 26 16.59	36 28 35.418	89 28 37.927
		179 59 59.87	00.00				
65	Donaldson	35 29 53,54	52.78	3,265.83	78 27 33.01		
67	Grampus	92 22 21.84	20.87	2,402.31	166 03 55.72		
68	State Line	52 07 47.45	46.35	4,133.56	293 55 55.53	36 29 51.061	89 29 01.172
		02.83	00.00				
67	Grampus	47 21 14.13	15.74	2,402.31	166 03 55.72		
68	State Line	72 38 28.33	29.80	2,040.31	273 25 12.10		
69	Bryan's	60 00 13.08	14.46	2,647.50	33 25 46.30	36 29 47.104	89 27 39.338
		179 59 55.54	00.00				
68	State Line	98 44 36.89	36.56	2,040.31	273 25 12.10		
69	Bryan's	47 10 00.58	00.40	3,597.92	140 36 01.17		
70	Everett	34 05 23.60	23.04	2,669.51	354 40 29.62	36 31 17.292	89 29 11.127
		01.07	00.00				
68	State Line	48 41 29.48	30.85	2,669.51	174 40 35.54		
70	Everett	100 11 49.38	50.73	3,880.95	94 52 20.35		
71	Bob Watson	31 06 37.30	38.42	5,084.92	305 57 26.29	36 31 27.958	89 31 46.556
		179 59 56.16	00.00				
68	State Line	35 04 25.85	26.02	5,084.92	125 59 04.69		
71	Bob Watson	41 29 40.01	39.56	3,004.13	347 27 06.24		
72	Compromise	103 25 54.62	54.42	3,463.74	270 53 16.30	36 29 52.825	89 31 20.330
		00.48	00.00				
71	Bob Watson	32 38 49.78	49.08	3,004.13	347 27 06.24		
72	Compromise	114 49 14.14	12.58	3,013.51	52 38 09.26		
73	Island No. 11	32 32 60.76	58.34	5,070.16	200 05 13.69	36 28 53.482	89 32 56.548
		04.68	00.00				
72	Compromise	36 06 56.41	57.21	3,013.51	52 38 09.26		
73	Island No. 11	105 13 38.39	38.43	2,843,54	337 50 50.47		
74	Beshire	38 39 25.00	24.36	4,654.92	196 30 40.45	36 27 28.038	89 32 13.488
		179 59 59.80	00.00				
73	Island No. 11	32 01 40.49	40.32	2,843.54	337 50 50.47		
74	Beshire	100 31 55.10	54.05	2,047.34	57 19 22.02		
75	Point Pleasant	47 26 27.19	25.63	3,795.45	189 52 15.26	36 26 52.171	89 33 22.686
		02.78	00.00				

Tabulated results of secondary triangulation from Cairo to Memphis—Continued.

No.	Stations.	Observed angles.	Corrected angles.	Distance.	Azimuth.	Latitude.	Longitude.
		° ′ ″	″	*Miles.*	° ′ ″	° ′ ″	° ′ ″
74	Beshire	62 59 11.33	11.71	2,047.34	57 19 22.02		
75	Point Pleasant	86 32 46.43	46.53	3,597.27	323 51 27.43		
76	Lazalla	30 28 02.60	01.76	4,030.46	174 20 19.79	36 25 17.917	89 31 57.521
		00.36	00.00				
75	Point Pleasant	30 50 38.08	36.52	3,597.27	323 51 27.43		
76	Lazalla	53 02 36.97	34.48	1,854.85	196 54 52.49		
77	Cronin	96 06 51.43	49.00	2,890.97	113 01 54.37	36 26 15.490	89 31 35.854
		06.48	00.00				
76	Lazalla	89 25 21.46	23.24	1,854.85	196 54 52.49		
77	Cronin	44 41 52.56	54.89	2,583.72	332 13 10.47		
78	Nall	45 52 40.63	41.87	1,817.42	106 20 57.29	36 25 01.325	89 30 47.518
		179 59 54.65	00.00				
76	Lazalla	55 48 51.96	51.33	1,817.42	286 20 15.73		
78	Nall	67 47 47.50	46.50	1,805.20	38 33 10.79		
79	Gold	56 23 23.54	22.17	2,020.46	162 09 21.82	36 24 15.522	89 31 32.670
		03.00	00.00				
78	Nall	38 00 10.73	11.07	1,805.20	38 33 10.79		
79	Gold	83 12 45.10	45.50	1,299.63	301 45 29.49		
80	Phillips	58 47 03.42	03.43	2,096.00	180 32 59.24	36 23 53.328	89 30 48.326
		179 59 59.25	00.00				
78	Nall	43 23 53.44	55.02	2,096.00	00 32 59.72		
80	Phillips	77 01 14.48	15.47	1,669.99	257 34 14.71		
81	New York	59 34 48.84	49.51	2,368.50	137 09 43.08	36 24 04.984	89 29 42.878
		179 59 56.76	00.00				
80	Phillips	98 05 54.85	56.15	1,669.79	257 34 14.71		
81	New York	39 51 43.72	45.81	2,469.04	37 43 07.74		
82	Buddell	42 02 19.13	18.04	1,598.47	175 40 13.73	36 23 01.616	89 30 43.482
		179 59 57.70	00.00				
81	New York	47 01 39.05	40.46	2,469.04	37 43 07.74		
82	Buddell	58 21 09.08	07.41	1,873.66	276 03 39.19		
83	Tiptonville	74 37 12.94	12.13	2,179.93	170 41 35.67	36 22 55.192	89 29 28.730
		01.07	00.00				
82	Buddell	103 49 43.90	42.77	1,873.66	276 03 39.19		
83	Tiptonville	43 53 52.45	51.90	3,407.25	52 10 31.63		
84	Reel Foot	32 16 27.32	25.33	2,433.02	119 53 02.27	36 21 47.390	89 31 16.684
		03.67	00.00				
82	Buddell	39 13 23.96	24.09	2,433.02	19 53 21.96		
84	Reel Foot	78 18 00.72	00.17	1,734.86	121 35 02.10		
85	Turkey	62 28 36.57	35.74	2,686.52	239 05 51.20	36 22 16.864	89 32 15.970
		01.25	00.00				
84	Reel Foot	44 21 16.78	18.20	1,734.86	121 35 02.10		
85	Turkey	93 21 11.23	12.09	1,802.40	34 55 39.03		
86	Riley	42 17 29.46	29.71	2,573.75	257 12 44.21	36 21 28.920	89 32 57.360
		179 59 57.47	00.00				
85	Turkey	58 38 14.33	14.82	1,802.40	34 55 39.03		
86	Riley	78 29 00.21	00.37	2,261.80	136 26 14.12		
87	Stewart	42 52 45.25	44.81	2,595.49	273 32 52.22	36 22 22.088	89 33 59.890
		179 59 59.79	00.00				
86	Riley	66 14 49.37	48.94	2,261.80	136 26 14.12		
87	Stewart	64 38 14.26	13.59	2,738.24	21 03 50.63		
88	Joe Eckles	49 06 58.61	57.47	2,703.30	250 10 24.72	36 20 59.185	89 34 39.358
		00.24	00. 00				

Tabulated results of secondary triangulation from Cairo to Memphis—Continued.

No.	Stations.	Observed angles.	Corrected angles.	Distance.	Azimuth.	Latitude.	Longitude.
		° ′ ″	″	*Miles.*	° ′ ″	° ′ ″	° ′ ″
87	Stewart	39 14 46.86	47.81	2,738.24	21 03 50.63		
88	Joe Eckles	87 33 41.18	41.46	2,163.72	113 29 45.77		
89	Atkinson	53 11 30.87	30.73	3,416.94	240 17 27.85	36 21 27.165	89 35 58.946
		179 59 58.91	00.00				
88	Joe Eckles	77 40 13.53	14.48	2,163.72	113 29 45.77		
89	Atkinson	65 29 18.03	19.23	3,525.43	358 58 17.82		
90	Solitude	36 50 26.08	26.29	3,283.44	215 48 45.63	36 19 32.806	89 35 56.410
		179 59 57.64	00.00				
88	Joe Eckles	47 51 36.00	35.51	3 283.44	35 49 31.29		
90	Solitude	77 56 09.58	08.59	3,001.68	293 44 54.22		
91	Bass	54 12 17.29	15.90	3,958.68	167 58 13.38	36 18 53.572	89 34 06.272
		02.87	00.00				
90	Solitude	30 20 18.68	19.85	3,001.68	293 44 54.22		
91	Bass	84 17 59.31	59.53	1,668.06	29 27 59.93		
92	Ingram	65 21 40.65	40.62	3,286.02	144 05 59.82	36 18 06 455	89 34 39.159
		179 59 58.64	00.00				
91	Bass	53 42 53.85	54.78	1,668.06	29 27 59.93		
92	Ingram	78 31 18.51	19.04	1,816.12	287 58 59.49		
93	Royal Bill	47 45 46.15	46.18	2,207.95	155 45 26.67	36 17 48.258	89 33 29.930
		179 59 58.51	00.00				
92	Ingram	42 18 02.63	02.76	1,816.12	287 58 59.49		
93	Royal Bill	70 06 32.65	32.29	1,541.67	37 53 08.19		
94	Balson	61 35 25.61	24.95	1,941.65	156 17 20.78	36 17 08.781	89 34 07.866
		00.89	00.00				
93	Royal Bill	58 10 38.52	37.59	1,541.67	37 53 08.19		
94	Balson	88 15 16.79	15.51	2,369.04	306 08 01.24		
95	River Bed	33 34 19.00	06.90	2,786.86	159 42 53.51	36 16 23.452	89 32 51.208
		04.31	00.00				
94	Balson	64 24 40.99	42.06	2,369.04	306 08 01.24		
95	River Bed	55 15 12.86	03.66	2,458.92	70 53 42.94		
96	Island No. 14	60 20 13.79	14.28	2,240.10	190 32 33.58	36 15 57.332	89 34 24.290
		179 59 57.64	00.00				
95	River Bed	30 40 17.86	19.01	2,458.92	70 53 42.94		
96	Island No. 14	115 27 04.60	04.82	2,250.33	6 19 52.69		
97	Dr. Smith	33 52 36.78	36.17	3,983.23	220 12 23.00	36 14 44.768	89 34 34.229
		179 59 59.24	00.00				
96	Island No. 14	63 41 14.81	15.78	2,250.33	6 19 52.69		
97	Dr. Smith	69 28 55.63	56.33	2,765.80	116 50 50.48		
98	Garrett	46 49 47.71	47.89	2,889.75	250 00 04.13	36 15 25.280	89 36 13.077
		179 59 58.15					
97	Dr. Smith	33 36 32.60	32.01	2,765.80	116 50 50.48		
98	Garrett	83 51 58.91	57.50	1,725.55	20 41 49.53		
99	Le Duke	62 31 32.19	30.49	3,099.56	263 13 05.59	36 14 32.910	89 36 37.501
		03.70	00.00				
98	Garrett,	55 40 46.99	46.54	1,725.55	20 41 49.53		
90	Le Duke	83 19 15.15	14.76	2,172.27	117 22 20.33		
100	Hathaway	40 59 59.78	58.70	2,612.34	256 21 35.93	36 15 05.306	89 37 54.768
		01.92	00.00				
98	Garrett	30 29 44.61	44.85	2,172.27	76 22 36.07		
100	Hathaway	112 41 58.97	58.28	2,212.85	143 39 37.65		
101	Matt	36 48 18.29	16.87	4,022.76	286 50 49.70	36 16 03.134	89 38 47.300
		01.87	00.00				

Tabulated results of secondary triangulation from Cairo to Memphis—Continued.

No.	Stations.	Observed angles.	Corrected angles.	Distance.	Azimuth.	Latitude.	Longitude.
		° ′ ″	″	*Miles.*	° ′ ″	° ′ ″	° ′ ″
100	Hathaway	46 33 13.91	14.66	2,212.85	143 39 37.65		
101	Matt	104 16 41.01	41.63	3,296.45	67 55 48.21		
102	Gayosa	29 10 03.94	03.71	4,400.16	277 04 39.56	36 15 22.932	89 40 49.669
		179 59 58.86	00.00				
100	Hathaway	50 01 56 08	55.48	4,400.16	97 06 22.99		
102	Gayosa	57 04 03 68	02.62	3,528.27	334 08 42.18		
103	Meyers	72 54 03.13	01.90	3,863.90	227 03 20.53	36 13 39.915	89 39 48.058
		02.89	00.00				
102	Gayosa	32 24 52.44	53.01	3,528.27	334 08 42.18		
103	Meyers	58 01 29.74	29.45	1,891.36	96 07 49.16		
104	Warden	89 33 37.83	37.54	2,993.04	186 33 27.10	36 13 46.461	89 41 03.360
		00.01	00.00				
103	Myers	82 09 19.69	20.14	1,891.36	96 07 49.16		
104	Warden	53 52 09.63	10.49	2,698.47	329 59 15.14		
105	Ferris	43 58 29.49	29.37	2,200.08	193 58 16.45	36 12 30.647	89 40 09.326
		179 59 58.81	00.00				
103	Myers	41 33 28.98	28.22	2,200.08	13 58 29.02		
105	Ferris	59 00 01.30	59.95	1,484.62	252 58 16.40		
106	Island No. 15	79 26 33.30	31.83	1,918.31	152 25 21.81	36 12 44.750	89 39 12.498
		03.58	00.00				
105	Ferris	50 23 12.15	12.50	1,484.62	252 58 16.40		
106	Island No. 15	96 48 44.88	44.77	2,111.24	336 10 05.20		
107	Camthersville	32 48 03.69	02.73	2,721.21	123 22 22.63	36 11 42.091	89 38 38.354
		00.72	00.00				
106	Island No. 15	44 41 16.83	16.72	2,111.24	336 10 05.20		
107	Camthersville	96 13 55.87	55.20	2,355.17	252 24 20.57		
108	Perkins	39 04 49.43	48.08	3,329.22	111 30 01.73	36 12 05.179	89 37 08.490
		02.13	00.00				
107	Camthersville	49 58 13.91	13.99	2,355.17	252 24 20.57		
108	Perkins	60 58 25.68	25.30	1,930.93	11 26 48.34		
109	Harbert	69 03 21.30	20.71	2,205.05	122 23 18.57	36 11 03.776	89 37 23.827
		00.89	00.00				
108	Perkins	63 21 20.90	20.44	1,930.93	11 26 48.34		
109	Harbert	40 50 30.43	29.69	1,780.30	232 17 08.97		
110	Williams	75 48 10.74	09.87	1,302.58	128 05 52.13	36 11 39 106	89 36 27.458
		02.07	00.00				
109	Harbert	86 19 08.17	09.19	1,780.30	232 17 08.97		
110	Williams	42 38 00.25	01.24	2,284.57	9 39 41.01		
111	Island No. 16	51 02 49.03	49.57	1,550.55	138 36 42.38	36 10 26.036	89 36 42.800
		179 59 57.45	00.00				
110	Williams	34 34 48.05	48.21	2,284.57	9 39 41.01		
111	Island No. 16	112 40 01.01	00.37	2,396.62	302 19 32.32		
112	Linwood	32 45 12.92	11.42	3,896.54	155 05 31.57	36 09 44.449	89 35 21.775
		01.98	00.00				
111	Island No. 16	73 00 48.86	49.88	2,396.62	302 19 32.32		
112	Linwood	64 11 43.89	44.75	3,374.07	58 08 35.39		
113	Johnson	42 47 25.11	25.37	3,176.20	195 20 02.37	36 08 46.656	89 37 16.410
		179 59 57.86	00.00				
112	Linwood	41 21 58.98	60.56	3,374.07	58 08 35.39		
113	Johnson	97 46 16.77	17.73	3,408.34	335 53 45.49		
114	Booth's Point	40 51 41.39	41.71	5,109.92	196 46 00.05	36 07 05.713	89 36 20.751
		179 59 57.14	00.00				

Tabulated results of secondary triangulation from Cairo to Memphis—Continued.

No.	Stations.	Observed angles.	Corrected angles.	Distance.	Azimuth.	Latitude.	Longitude.
		° ′ ″	″	*Miles.*	° ′ ″	° ′ ″	° ′ ″
113	Johnson	40 41 41.51	42.20	3,408.34	335 53 45.49		
114	Booth's Point	56 53 31.53	31.59	2,241.98	99 00 46.72		
115	Wilks	82 24 46.23	46.21	2,880.19	196 35 08.30	36 07 17.099	89 37 49.296
		00.27	00.00				
114	Booth's Point	55 38 50.12	48.99	2,241.98	99 00 46.72		
115	Wilks	51 26 61.11	59.60	1,936.50	330 26 54.12		
116	Parker	72 54 13.09	11.41	1,834.43	223 21 28.05	36 06 22.442	89 37 11.111
		04.32	00.00				
115	Wilks	63 41 08.53	09.28	1,936.50	330 26 54.12		
116	Parker	74 23 44.63	45.11	2,598.28	76 03 31.52		
117	Sand Bar	41 55 05.74	05.61	2,791.81	214 07 26.49	36 06 02.120	89 38 51.924
		179 59 58.90	00.00				
116	Parker	39 56 50.19	49.85	2,598.28	76 03 31.52		
117	Sand Bar	86 45 55.63	54.63	2,081.10	342 48 26.74		
118	Bell's Point	53 17 16.92	15.52	3,236.02	216 05 56.76	36 04 57.614	89 38 27.338
		02.74	00.00				
117	Sand Bar	58 46 45.63	44.98	2,081.10	342 48 26.74		
118	Bell's Point	77 45 24.20	23.21	2,587.15	85 03 18.01		
119	Island No. 18	43 27 53.37	51,81	2,956.47	221 34 25.52	36 04 50.367	89 40 10.354
		03.20	00.00				
118	Bell's Point	38 50 50.81	51.71	2,587.15	85 03 18.01		
119	Island No. 18	86 11 24.85	25.07	1,981.99	351 13 42 41		
120	McAllister No. 2	54 57 43.38	43.22	3,152.81	226 11 32.75	36 03 46.814	89 39 58.277
		179 59 59.04	00.00				
119	Island No. 18	51 53 44.22	43.11	1,981.99	351 13 42.41		
120	McAllister No. 2	49 57 53.74	52.21	1,593.61	121 15 57.31		
121	North Base	78 08 26.33	24.68	1,550.60	223 07 00.58	36 04 13.646	89 40 52.712
		04.29	00.00				
120	McAllister No. 2	37 46 51.72	52.92	1,593.61	121 15 57.31		
121	North Base	105 09 21.31	22.35	1,619.97	46 24 47.61		
122	South Base	37 03 44.91	44.73	2,552.22	263 28 04.24	36 03 37.407	89 41 39.597
		179 59 57.94	00.00				
121	North Base	49 15 05.01	05.80	1,619.97	46 24 56.70		
122	South Base	85 06 44.34	45.11	1,716.65	311 31 14.21		
123	Mitchell's Point	45 38 09.07	09.09	2,257.72	177 09 53.52	36 03 00.592	89 40 47.570
		179 59 58.42					
122	South Base	88 09 02.27	00.26	1,716.65	311 31 14.21		
123	Mitchell's Point	59 38 04.81	02.81	3,218.40	71 53 41.62		
124	Lindale	32 12 58.42	56.93	2,778.33	219 39 32.79	36 02 28.124	89 42 49.770
		05.50					
123	Mitchell's Point	47 24 36.69	38.15	3,218.40	71 53 41.62		
124	Lindale	80 14 03.29	05.04	2,992.47	332 06 34.76		
125	Franklin	52 21 14.81	16.81	4,005.73	204 28 24.45	36 01 02.307	89 41 53.868
		179 59 54.79					
124	Lindale	46 31 60.15	59.41	2,992.47	332 06 34.76		
125	Franklin	81 57 32.35	31.91	2,774.84	70 09 35.73		
126	Missouri	51 30 28.86	28.68	3,785.70	198 38 05.77	36 00 31.738	89 43 38.093
		01.36					
125	Franklin	39 54 01.58	00.20	2,774.84	70 09 35.73		
126	Missouri	58 27 30.72	29.73	1,799.03	308 36 04.18		
127	Island No. 21	81 38 31.02	30.07	2,390.27	210 15 07.25	35 59 55.318	89 42 41.958
		03.32					

Tabulated results of secondary triangulation from Cairo to Memphis—Continued.

No.	Stations.	Observed angles.	Corrected angles.	Distance	Azimuth.	Latitude.	Longitude.
		° ′ ″	″	*Miles.*	° ′ ″	° ′ ″	° ′ ″
126	Missouri	43 32 07.30	04.98	1,799.03	308 36 04.18		
127	Island No. 21	94 21 57.83	55.86	1,848.33	34 14 41.32		
128	Arkansas	42 05 60.77	59.16	2,675.64	172 08 17.76	35 59 05.743	89 43 23.479
		05.90	00.00				
127	Island No. 21	47 34 07.77	07.41	1,848.33	34 14 41.32		
128	Arkansas	73 41 19.51	19.44	1,595.88	287 55 36.36		
129	Stevens	58 44 33.02	33.15	2,075.15	166 40 45.12	35 58 49.801	89 42 22.869
		00.30	00.00				
128	Arkansas	53 09 05.57	04 93	1,595.88	287 55 36.36		
129	Stevens	92 41 01.79	01.42	2,274.06	15 15 10.55		
130	Czar	34 09 53.54	53.65	2,838.66	161 05 02.88	35 57 38.617	89 42 46.744
		00.90	00.00				
129	Stevens	29 40 36.21	37.11	2,274.06	15 15 10.55		
130	Czar	108 25 04.66	06.13	1,685.76	303 40 02.66		
131	Mrs. H	41 54 14.93	16.76	3,230.41	165 34 52.29	35 57 08.292	89 41 50.760
		55.80	00.00				
130	Czar	33 29 12.65	10.41	1,685.76	303 40 02.66		
131	Mrs. H	112 21 31.09	29.35	1,656.62	236 02 04.88		
132	Statar	34 09 21.50	20.24	2,776.85	90 11 57.31	35 57 38.318	89 40 55.930
		05.24	00.00				
131	Mrs. H	67 14 40.68	39.28	1,656.62	236 02 04.88		
132	Statar	61 29 47.15	45.89	1,958.58	354 32 51.18		
133	Casselberry	51 15 35.83	34.83	1,866.45	123 17. 20.71	35 56 35.058	89 40 48.505
		03.66	00.00				
132	Statar	50 02 50.15	49.57	1,958.58	354 32 51.18		
133	Casselberry	83 19 15.47	15.17	2,065.30	257 52 10.71		
134	Michell	46 37 55.25	55.26	2,675.92	124 30 53.26	35 56 49.132	89 39 27.940
		00.87	00.00				
133	Casselberry	37 01 38.49	38.70	2,065.30	257 52 10.71		
134	Michell	60 12 09.56	10.20	1,253.69	17 40 47.80		
135	Wright's Point	82 46 10.42	11.10	1,806.61	114 54 27.79	35 56 10.376	89 39 43.129
		58.47	00.00				
134	Michell	70 11 54.29	55.68	1,253.69	17 40 47.80		
135	Wright's Point	78 12 22.08	23.40	2,251.47	275 53 02.28		
136	Obion	31 35 39.00	40.92	2,342.45	127 29 35.64	35 56 02.878	89 38 13.784
		55.37	00.00				
134	Michell	51 13 53.75	54.12	2,342.45	307 28 52.12		
136	Obion	76 29 09.05	09.68	2,308.84	51 00 25.96		
137	Tinsley	52 16 55.31	56.20	2,879.26	178 42 47.76	35 55 15.736	89 39 25.360
		58.11	00.00				
136	Obion	32 09 50.48	51.65	2,308.84	51 00 25.96		
137	Tinsley	108 10 45.52	47.21	1,925.97	339 10 31.17		
138	Hales	39 39 19.06	21.14	3,437.28	198 56 08.32	35.54 17.328	89 38 58.055
		179 59 56.06	00.00				
137	Tinsley	82 33 53.75	53.64	1,925.97	339 10 31.17		
138	Hales	38 22 44.75	44.68	2,226.71	120 48 02.50		
139	High Water	59 03 21.56	21.68	1,394.20	241 43 56.08	35 54 54.316	89 40 14.338
		180 00 00.06	00.00				
138	Hales	30 57 30.69	30.26	2,226.71	120 48 02.50		
139	High Water	116 45 01.46	01.58	2,144 15	57 32 19.34		
140	Nebraska	32 17 27.52	28.16	3,722.04	269 49 05.18	35 54 16.970	89 41 26.484
		179 59 59.67	00.00				

Tabulated results of secondary triangulation from Cairo to Memphis—Continued.

No.	Stations.	Observed angles.	Corrected angles.	Distance.	Azimuth.	Latitude.	Longitude.
		° ′ ″	″	*Miles.*	° ′ ″	° ′ ″	° ′ ″
139	High Water	38 34 23.96	24.23	2,144.15	57 32 19.34		
140	Nebraska	43 32 42.40	43.07	1,349.66	193 58 53.95		
141	Puck	97 52 52.08	52.70	1,491.25	276 06 08.88	35 54 59.464	89 41 13.74
		179 59 58.44	00.00				
140	Nebraska	103 31 24.04	23.66	1,349.66	193 58 53.95		
141	Puck	46 16 58.33	57.88	2,609.20	60 15 59.46		
142	Rucker's Point	30 11 38.35	38.46	1,939.60	270 26 44.92	35 54 17.468	89 42 43.830
		180 00 00.72	00.00				
141	Puck	26 03 51.98	50.78	2,609.20	60 15 59.46		
142	Rucker's Point	106 43 12.29	11.75	1,562.05	133 31 54.71		
143	Buckner	47 12 57.71	57.47	3,404.85	266 18 30.75	35 54 52.373	89 43 28.996
		01.98	00.00				
142	Rucker's Point	99 20 29.85	30.66	1,562.05	133 31 54.71		
143	Buckner	40 57 25.94	26.69	2,412.95	354 28 54.91		
144	Carr	39 42 01.50	02.65	1,602.94	214 11 02.98	35 53 34.446	89 43 19.745
		179 59 57.29	00.00				
143	Buckner	29 56 48.54	48.39	2,412.95	354 28 54.91		
144	Carr	112 37 57.75	58.17	1,982.25	61 51 02.16		
145	Barfield	37 25 12.60	13.44	3,665.09	204 25 07.87	35 53 04.097	89 44 29.426
		58.89	00.00				
144	Carr	59 02 59.25	58.67	1,982.25	61 51 02.16		
145	Barfield	60 27 16.25	15.87	1,953.31	302 17 37.18		
146	Sheep	60 29 45.65	45.46	1,981.44	182 48 01.22	35 52 30.233	89 43 23.605
		01.15	00.00				
145	Barfield	34 40 33.54	32.63	1,953.31	302 17 37.18		
146	Sheep	112 36 34.46	34.02	2,056.22	9 41 41.74		
147	Island No. 25	32 42 53.28	53.35	3,336.41	156 58 40.31	35 51 24.469	89 43 37.405
		01.28	00.00				
146	Sheep	32 03 47.73	48.20	2,056.22	9 41 41.74		
147	Island No. 25	111 21 44.32	45.32	1,831.90	301 03 18.98		
148	K. C. B	36 34 25.04	26.48	3,213.74	157 38 22.09	35 50 53.802	89 42 34.867
		179 59 57.09	00.00				
147	Island No. 25	61 20 59.17	59.87	1,831.90	301 03 18.98		
148	K. C. B	65 04 52.00	52.87	1,998.10	55 59 02.74		
149	Flood	53 34 06.15	07.26	2,064.91	182 24 16.84	35 50 17.530	89 43 40.858
		57.32	00.00				
148	K. C. B	29 34 58.48	56.69	1,998.10	55 59 02.74		
149	Flood	112 27 43.75	42.54	1,603.78	348 26 06.64		
150	Forked Deer	37 57 21.56	20.77	3,002.20	206 23 34.90	35 49 26.549	89 43 28.049
		03.79	00.00				
149	Flood	52 46 19.79	21.30	1,603.78	348 26 06.64		
150	Forked Deer	90 58 35.17	36.93	2,159.58	77 27 37.20		
151	Island No. 26	36 14 59.56	61.77	2,711.83	221 11 46.28	35 49 11.327	89 44 52.02
		54.52	00.00				
150	Forked Deer	38 18 34.13	33.83	2,159.58	77 27 37.20		
151	Island No. 26	91 45 28.90	29.01	1,749.33	165 41 19.04		
152	Williams	49 55 56.77	57.16	2,820.60	295 45 11.80	35 50 06.325	89 45 09.255
		59.80	00.00				
151	Island No. 26	78 39 16.77	17.43	1,749.33	165 41 19.04		
152	Williams	69 54 30.73	31.27	3,288.55	55 35 40.26		
153	Bowen	31 26 10.10	11.30	3,149.98	267 00 48.30	35 49 06.020	89 46 57.338
		57.60	00.00				

Tabulated results of secondary triangulation from Cairo to Memphis—Continued.

No.	Stations.	Observed angles.	Corrected angles.	Distance.	Azimuth.	Latitude.	Longitude.
		° ′ ″	″	*Miles.*	° ′ ″	° ′ ″	° ′ ″
151	Island No. 26½.....	40 56 56.15	55.97	3,149.98	87 02 01.61		
153	Bowen	71 24 42.92	43.11	2,232.30	338 25 31.41		
154	Island No. 27	67 38 20.59	20.92	3.228.42	226 04 11.45	35 47 58.663	89 46 24.647
		59.66	00.00				
153	Bowen	39 04 55.42	55.08	2,232.30	338 25 31.41		
154	Island No. 27	106 30 15.68	15.74	2,490.10	51 55 34.79		
155	Daniel's Point.....	34 24 48.65	49.18	3,787.10	197 30 00.00	35 49 08.832	89 47 42.702
		179 59 59.75	00.00				
154	Island No. 27.....	28 58 52.31	53.03	2,490.10	51 55 34.79		
155	Daniel's Point.....	121 31 47.81	49.11	2,451.05	353 26 38.29		
156	Ashport.....	29 29 15.98	17.86	4,311.81	202 56 02.66	35 45 49.824	89 47 31.562
		179 59 56.10	00.00				
155	Daniel's Point.....	63 18 44.06	44.84	2,451.05	353 26 38.29		
156	Ashport.....	77 13 54.73	55.68	3,446.13	96 12 49.12		
157	Island No. 28.....	39 27 18.13	19.48	3,761.65	236 44 09.93	35 46 01.905	89 49 47.946
		179 59 56.92	00.00				
156	Ashport.....	36 08 38.97	38.50	3,446.13	96 12 49.12		
157	Island No. 28.....	97 23 18.65	18.63	2,803.63	13 34 48.04		
158	Johnson.....	46 28 02.58	02.87	4,713.92	240 02 35.60	35 44 33.479	89 50 14.144
		00.20	00.00				
157	Island No. 28.....	57 48 26.67	26.05	2,803.63	13 34 48.04		
158	Johnson.....	56 39 25.68	23.94	2,606.62	136 55 09.20		
159	Fletcher.....	65 32 11.04	10.01	2,573.14	251 22 17.87	35 45 35.246	89 51 25.015
		03.39	00.00				
158	Johnson.....	56 32 28.66	30.72	2,606.62	136 55 09.20		
159	Fletcher	86 21 06.04	07.07	3,604.67	43 15 34.87		
160	Island No. 29.....	37 06 23.25	22.21	4,311.89	260 20 59.65	35 44 10.059	89 53 03.319
		179 59 57.95					
159	Fletcher.....	35 50 19.58	20.22	3,604.67	43 15 34.87		
160	Island No. 29.....	115 38 09.48	07.96	4,419.57	107 36 29.47		
161	Elmot.....	28 31 36.23	31.82	6,805.24	259 03 19.72	35 44 53.406	89 55 50.978
		05.29					
160	Island No. 29.....	41 36 51.77	52.47	4,419.57	107 36 29.47		
161	Elmot	72 33 26.66	25.59	3,217.19	00 08 17.13		
162	Plum Point	65 49 43.72	41.94	4,621.55	245 57 58.89	35 43 09.019	89 55 51.286
		02.15					
161	Elmot.....	50 11 59.98	60.96	3,217.19	08 17.13		
162	Plum Point...	65 55 20.25	19.92	2,752.92	114 12 57.03		
163	Blackamore	63 52 40.21	39.12	3,271.43	230 19 19.58	35 43 45.645	89 57 31.189
		00.44	00.00				
162	Plum Point.....	80 08 52.21	51.62	2,752.92	114 12 57.03		
163	Blackamore	64 29 10.73	10.88	4,686.13	358 41 09.61		
164	Osceola.....	35 21 60.31	57.50	4,292.46	214 03 09.61	35 41 13.635	89 57 26.915
		03.25	00.00				
162	Plum Point.....	45 22 02.94	05.23	4,292.46	34 04 05.40		
164	Osceola.....	54 04 49.79	50.54	3,096.68	268 08 00.15		
165	Yankee Bar.....	80 33 03.75	04.23	3,524.03	168 42 16.19	35 41 16.891	89 55 23.824
		179 59 56.48	00.00				
164	Osceola.....	48 32 58.44	60.36	3,096.68	268 08 00.15		
165	Yankee Bar.....	82 31 58.66	59.19	3,079.34	5 37 12.77		
166	McGavock.....	48 55 01.28	00.45	4,073.49	136 42 05.33	35 39 37.455	89 55 35.814
		179 59 58.38	00.00				

Tabulated results of secondary triangulation from Cairo to Memphis—Continued.

No.	Stations.	Observed angles.	Corrected angles.	Distance.	Azimuth.	Latitude.	Longitude.
		° ′ ″	″	*Miles.*	° ′ ″	° ′ ″	° ′ ″
165	Yankee Bar	44 30 07.94	08.21	3,079.34	5 37 12.77		
166	McGavock	84 34 44.34	43.02	2,780.55	270 11 48.80		
167	Morgan	50 55 11.36	08.77	3,949.16	141 08 02.03	35 39 37.132	89 53 45.269
		03.64	00.00				
166	McGavock	75 46 38.31	39.59	2,780.55	70 11 48.80		
167	Morgan	54 34 12.17	13.05	3,536.59	235 38 40.21		
168	Midway	49 39 07.81	07.36	2,972.82	165 58 45.11	35 38 03.870	89 55 07.179
		179 59 58.29	00 00				
167	Morgan	39 26 05.58	07.15	3,536.59	35 38 40.21		
168	Midway	80 13 34.69	34.36	2,585.22	295 51 26.83		
169	Craigshead	60 20 19.71	18.49	4,010.82	176 12 39.17	35 37 27.276	89 53 34.731
		179 59 59.98	00.00				
168	Midway	52 30 53.85	54.88	2,585.22	295 51 26.83		
169	Craigshead	50 51 01.35	01.18	2,108.53	65 01 19.50		
170	Lanier	76 38 04.48	03.94	2,060.65	168 22 31.33	35 36 58.379	89 54 50.677
		59.68	00.00				
169	Craigshead	58 50 09.17	10.55	2,108.53	65 01 19.50		
170	Lanier	65 59 23.65	24.54	2,197.93	310 59 59.81		
171	Lee	55 10 24.58	24.91	2,346.36	186 11 03.09	35 36 11.586	89 53 44.774
		179 59 57.40	00.00				
170	Lanier	44 24 54.48	53.94	2,197 93	310 59 59.81		
171	Lee	96 29 38.63	37.26	2,437.46	34 31 00.92		
172	Island No. 34	39 05 31.15	28.80	3,463.33	175 25 00.16	35 35 06.362	89 54 39.680
		04.26	00.00				
171	Lee	32 08 07.30	09.15	2,439.46	34 31 00.92		
172	Island No. 34	117 15 04.79	06.06	2,548.21	331 45 35.02		
173	Hatchie River	30 36 46.81	44.79	4,258.78	182 22 47.66	35 33 53.518	89 53 51.800
		179 59 58.90	00.00				
172	Island No. 34	30 02 58.85	62.13	2,548.21	331 45 35.02		
173	Hatchie River	115 33 24.96	24.93	2,259.07	36 12 37.94		
174	Pierce	34 23 32.19	32.94	4,069.84	181 48 34.19	35 32 54.371	89 54 44.784
		179 59 56.00	00.00				
173	Hatchie River	51 38 53.62	55.82	2,259.07	36 12 37.94		
174	Pierce	87 18 38.75	40.32	2,698.22	303 30 47.45		
175	Hatchie Island	41 02 23.21	23.86	3,436.84	164 34 03.22	35 32 06.022	89 53 15.484
		57.58	00.00				
174	Pierce	35 58 43.85	43.98	2,698.22	303 30 47.45		
175	Hatchie Island	61 17 38.70	37.72	1,598.03	62 14 01.64		
176	Morgan Point	82 43 39.38	38.30	2,385.79	159 29 50.73	35 31 41.862	89 54 11.609
		01.93	00.00				
175	Hatchie Island	47 00 46.31	47.49	1,598.03	62 14 01.64		
176	Morgan Point	81 28 37.19	37.62	1,493.49	323 42 06.65		
177	Randolph	51 30 35.10	34.89	2,019.10	195 13 01.93	35 31 02.804	89 53 36.521
		58.60	00.00				
176	Morgan Point	78 41 37.81	39.11	1,493.49	323 42 06.65		
177	Randolph	71 32 59.88	61.45	2,950.86	72 09 25.57		
178	Chickasaw No. 2	29 45 19.54	19.44	2,854.59	222 23 01.38	35 30 33.452	89 55 27.985
		57.23	00.00				
176	Morgan Point	37 05 19.38	20.09	2,854.59	42 23 45.76		
178	Chickasaw No. 2	75 14 27.19	26.84	1,861.02	147 08 34.54		
179	O'Dare	67 40 13.75	13.07	2,984.17	259 27 58.19	35 31 24.176	89 56 08.059
		00.32	00.00				

Tabulated results of secondary triangulation from Cairo to Memphis—Continued.

No.	Stations.	Observed angles.	Corrected angles.	Distance.	Azimuth.	Latitude.	Longitude.
		° ′ ″	″	*Miles.*	° ′ ″	° ′ ″	° ′ ″
178	Chickasaw No. 2..	35 22 02.29	02.97	1,861.02	147 08 34.54		
179	O'Dare	28 48 59.06	58.62	1,196.62	355 57 09.88		
180	Whirlpool	115 48 58 46	58.41	996.47	291 46 10.24	35 30 45.445	89 56 04.707
		59.81	00.00				
179	O'Dare	86 20 34.06	33.58	1,196.62	355 57 09.88		
180	Whirlpool	48 54 33.21	33.42	1,696.31	127 02 38.40		
181	Richardson	44 54 54.29	53.00	1,281.07	262 17 14.18	35 31 18.600	89 56 58.443
		01.56	00.00				
179	O'Dare	44 53 55.21	56.90	1,281.07	82 17 43.46		
181	Richardson	103 30 54.71	55.60	1,726.44	158 46 18.58		
182	Haskins	31 35 07.92	07.50	2,378.13	307 10 56.66	35 32 10.817	89 57 23.257
		57.84	00.00				
181	Richardson	35 35 55.52	56.98	1,726.44	158 46 18.58		
182	Haskins	105 11 37.92	38.25	1,589.85	83 57 42.41		
183	Island No. 35	39 12 25.42	24.77	2,635.70	303 09 30.70	35 32 05.386	89 58 26.016
		58.86	00.00				
182	Haskins	37 25 25.94	28.66	1,589.85	83 57 42.41		
183	Island No. 35	111 24 06.33	07.99	1,866.56	152 32 57.94		
184	Lanier	31 10 23.02	23.35	2,859.62	301 22 14.73	35 32 59.131	89 59 00.177
		55.29	00.00				
183	Island No. 35	56 45 58.52	59.03	1,866.56	152 32 57.94		
184	Lanier	86 30 34.27	34.24	2,610,99	59 03 12.32		
185	Cole	36 43 26.71	26.73	3,115.74	275 45 47.37	35 32 15.555	90 00 29.070
		59.50	00.00				
184	Lanier	31 00 42.29	44.76	2,610.99	59 03 12.32		
185	Cole	90 03 14.70	15.92	1,570.51	148 59 04.72		
186	Elliott	58 55 58.54	59.32	3,048.20	270 02 46.73	35 32 59.228	90 01 01.197
		55.53	00.00				
185	Cole	68 41 50.93	51.23	1,570.51	148 59 04.72		
186	Elliott	78 14 37.92	38.37	2,682.35	47 13 24.43		
187	Golden Lake	33.03 31.25	30.40	2,818.66	260 16 09.40	35 32 00.111	90 02 19.348
		00.10	00.00				
185	Cole	43 31 02.09	03.22	2,818.66	80 17 13.49		
187	Golden Lake	66 41 28.33	28.68	2,068.19	326 57 38.08		
188	Strout	69 47 28.02	28.10	2,758.43	216 45 32.18	35 31 03.852	90 01 34.596
		56.44	00.00				
187	Golden Lake	32 03 40.52	42.73	2,068.19	326 57 38.08		
188	Strout	115 52 06.46	07.53	2,067.75	31 05 56.55		
189	Powers	32 04 09.79	09.74	3,504.96	179 01 22.20	35 30 06.399	90 02 16.974
		56.77	00.00				
188	Strout	34 24 52.46	53.66	2,067.75	31 05 56.55		
189	Powers	46 53 21.15	21.26	1,182.25	257 58 53.20		
190	Blizzard	98 41 44.85	45.08	1,527.08	176 41 04.93	35 30 14.384	90 013 1.092
		58.46	00.00				
189	Powers	46 40 39.48	40.40	1,182.25	257 58 53.20		
190	Blizzard	102 34 25.46	26.21	1,682.28	335 24 53.64		
191	Pennell	30 44 53.73	53.39	2,256.93	124 40 16.37	35 29 24.745	90 01 03.324
		58.67	00.00				
189	Powers	33 31 07.81	09.13	2,256.93	304 39 33.60		
191	Pennell	111 14 46,13	46.32	2,160.27	13 25 30.05		
192	Pecan Point	35 14 05.42	04.55	3,646.10	158 11 13.95	35 28 16.563	90 01 23.217
		59.36	00.00				

Tabulated results of secondary triangulation from Cairo to Memphis—Continued.

No.	Stations.	Observed angles.	Corrected angles.	Distance	Azimuth.	Latitude.	Longitude.
		° ′ ″	″	*Miles.*	° ′ ″	° ′ ″	° ′ ″
191	Pennell	29 35 47.58	49.22	2,160.27	13 25 30.05		
192	Pecan Point	109 31 49.06	49.39	1,630.47	302 57 07.89		
193	Wallace	40 52 21.93	21.39	3,111.31	163 50 00.76	35 27 47.782	90 00 28.956
		58.57	00.00				
192	Pecan Point	43 29 11.04	10.64	1,630.47	302 57 07.89		
193	Wallace	106 12 11.03	09.84	2,223.26	16 45 29.53		
194	Dean	30 18 41.98	39.52	3,102.31	166 26 35.27	35 26 38.704	90 00 54.373
		04.05	00.00				
193	Wallace	36 15 50.08	49.40	2,223.26	16 45 29 53		
194	Dean	84 09 43.96	42.27	1,525.08	280 54 57.06		
195	Wright	59 34 30.46	28.33	2,564.95	160 29 59.82	35 26 29.328	89 59 54.999
		04.50	00.00				
194	Dean	58 55 55.78	58.04	1,525.08	280 54 57.06		
195	Wright	89 04 15.57	17,38	2,465.44	11 51 14.11		
196	Universe	31 59 43.96	44.58	2,877.92	159 51 17.89	35 25 11.034	90 00 15.073
		55.31	00.00				
195	Wright	39 58 43.82	44.93	2,465.44	11 51 14.11		
196	Universe	95 54 14.06	14.27	2,275.55	95 56 48.20		
197	McGavock	44 07 01.35	00.80	3,522.88	231 48 55.40	35 25 18.675	90 01 44.789
		59.23	00.00				
196	Universe	30 37 55.31	56.09	2,275.55	95 56 48.20		
197	McGavock	121 16 03.12	02.64	2,461.60	37 11 58.84		
198	Thomas	28 06 03.15	01.27	4,129.44	245 17 25 92	35 24 15.048	90 02 43.770
		01.58	00.00				
197	McGavock	50 32 46.56	48.09	2,461.60	37 11 58.84		
198	Thomas	98 35 42.15	43.07	3,705.70	118 35 41.58		
199	Corona	30 51 29.17	28.84	4,745.35	267 42 58.01	35 25 12.580	90 04 52.740
		57.88	00.00				
198	Thomas	51 16 58.60	57.55	3,705.70	118 35 41.58		
199	Corona	41 21 03.02	01.37	2,894.40	339 55 28.22		
200	Cut-off	87 22 02.77	01.08	2,450.81	247 17 52.11	35 23 44.365	90 04 13.371
		04.39	00.00				
199	Corona	38 49 28.33	27.13	2,894.40	339 55 28 22		
200	Cut-off	64 44 06.27	04.14	1,866.62	95 11 46.89		
201	Brandywine	76 26 31.04	28.73	2,692.56	198 44 35.49	35 23 49.845	90 05 27.035
		05.64	00.00				
200	Cut-off	80 18 20.58	22.64	1,866.62	95 11 46.89		
201	Brandywine	60 19 40.21	42.15	2,900.95	335 30 46.37		
202	Bateman	39 21 54.19	55.21	2,557.08	194 53 09.16	35 22 24.177	90 04 39.401
		54.98	00.00				
201	Brandywine	30 22 23.96	26.42	2,900.95	335 30 46.37		
202	Bateman	100 28 31.12	32.31	1,939.17	55 02 41.64		
203	Croaker	49 09 00.73	01.27	3,771.14	185 53 03.93	35 21 48.121	90 05 42.356
		55.81	00.00				
202	Bateman	35 16 37.33	38.52	1,939.17	55 02 41.64		
203	Croaker	95 58 07.19	08.30	1,489.52	331 00 13.50		
204	Barksdale	48 45 12.65	13.18	2,565.10	199 45 43.23	35 21 05.846	90 05 13.759
		57.17	00.00				
202	Bateman	40 50 15.18	15.58	2,565.10	19 46 03.12		
204	Barksdale	82 13 13.32	12.86	2,001.35	117 32 30.37		
205	Fogleman	56 56 32.50	31.56	3,032.38	240 35 18.14	35 21 35.869	90 06 24.047
		01.00	00.00				

Tabulated results of secondary triangulation from Cairo to Memphis—Continued.

No.	Stations.	Observed angles.	Corrected angles.	Distance.	Azimuth.	Latitude.	Longitude.
		° ′ ″	″	*Miles.*	° ′ ″	° ′ ″	° ′ ″
204	Barksdale	42 30 13.13	15.13	2,001.35	117 32 30.37		
205	Fogleman	70 01 19.48	21.76	1,463.89	7 33 11.47		
206	Island No. 39	67 28 21.41	23.11	2,036.29	255 01 30.17	35 20 48.779	90 06 31.667
		54.02	00.00				
204	Barksdale	34 46 22.19	24.06	2,036.29	75 02 15.24		
206	Island No. 39	100 08 09.48	10.28	1,639.83	355 09 40.45		
207	Hearn	45 05 25.60	25.66	2,830.34	220 15 09.28	35 19 55.758	90 06 26.190
		57.27	00.00				
206	Island No. 39	45 09 34.17	34.56	1,639.83	355 09 40.45		
207	Hearn	103 28 09.65	09.30	2,233.58	71 41 34.32		
208	Sand Bar	31 22 17.71	16.14	3,063.36	220 18 29 63	35 19 32.984	90 07 50.147
		01.53	00.00				
207	Hearn	39 00 33.53	34 74	2,233.58	71 41 34.32		
208	Sand Bar	103 59 52.71	53.01	2,336.57	355 40 38.78		
209	Island No. 40	36 59 32.95	32.25	3,601.84	212 40 15.06	35 18 17.380	90 07 43.176
		59.39	00.00				
208	Sand Bar	52 14 12.81	12.16	2,336.57	355 40 38.78		
209	Island No. 40	67 30 52.18	50.96	2,127.60	108 09 51.85		
210	Dixon	60 14 58.54	56.88	2,486.70	227 54 08.72	35 18 38.895	90 09 03.200
		03.53	00.00				
209	Island No. 40	43 34 04.70	06.40	2,127.60	108 09 51.85		
210	Dixon	45 25 59.06	60.05	1,546.00	333 35 05.65		
211	Overton	87 59 52.58	53.55	1,516.71	241 35 14.93	35 17 53.965	90 08 35.979
		56.34	00.00				
210	Dixon	60 23 42.65	42.91	1,546.00	333 35 05.65		
211	Overton	86 01 22.10	20.94	2,430.11	67 34 00.44		
212	Bradley	33 34 58.44	56.15	2,788.26	213 58 12.93	35 17 23.864	90 10 04.872
		04.19	00.00				
211	Overton	69 24 11.50	11.53	2,430.11	67 34 00.44		
212	Bradley	47 58 01.56	01.30	2,561.53	295 31 10.38		
213	Beef Island	62 37 47.81	47.17	2,032.52	178 09 50.39	35 16 48.045	90 08 33.402
		59.87	00.00				
212	Bradley	34 02 18 75	20.50	2,561 53	295 31 10 38		
213	Beef Island	116 09 19.90	20.55	2,884 67	359 22 42.67		
214	Ferguson	29 48 19.60	18.95	4,625.71	149 34 24.44	35 15 14.445	90 08 32.164
		58.25	00.00				
213	Beef Island	49 21 27.73	29.39	2,884.67	359 22 42.67		
214	Ferguson	62 20 56.88	57.90	2,355.95	241 43 41.29		
215	Island No. 41	68 17 31.98	32.71	2,750.26	130 02 01.39	35 15 50.648	90 07 10,076
		56.59	00.00				
214	Ferguson	30 01 57.36	59.16	2,355.95	241 43 41.29		
215	Island No. 41	58 25 38.12	38.63	1,179.58	3 18 50.05		
216	Trice	91 32 21.69	22.21	2,007.94	91 46 26.28	35 15 12.436	90 07 12.773
		57.17	00.00				
215	Island No. 41	47 48 44.79	45.36	1,179.58	3 18 50.05		
216	Trice	100 11 04.18	04.08	1,649.20	283 29 52.57		
217	Walt	32 00 11.86	70.56	2,190.71	135 30 39.74	35 14 59.940	90 06 09.341
		00.83	00.00				
216	Trice	28 09 50.39	53.38	1,649.20	283 29 52 57		
217	Walt	104 17 56.18	57.78	1,055.22	207 48 26.96		
218	Pratt	47 32 07.92	08.84	2,166.33	75 20 47.04	35 15 30.227	90 05 49.867
		54.49	00.00				

Tabulated results of secondary triangulation from Cairo to Memphis—Continued.

No.	Stations.	Observed angles.	Corrected angles.	Distance.	Azimuth.	Latitude.	Longitude.
		° ′ ″	″	*Miles.*	° ′ ″	° ′ ″	° ′ ″
217	Walt	65 29 23.76	23.28	1,055.22	207 48 26.96		
218	Pratt	84 02 05.02	04.62	1,893.12	303 46 33.57		
219	Weatherford	30 28 33.85	32.10	2,069.34	93 18 37.40	35 14 56.070	90 04 47.624
		02.63	00.00				
217	Walt	40 48 24.39	26.37	2,069.34	273 17 50 24		
219	Weatherford	61 40 29.90	31.01	1,385.09	31 38 06.39		
220	Patten	77 31 01.67	02.62	1,865.68	134 06 47.19	35 14 17.802	90 05 16.356
		55.96	00.00				
219	Weatherford	57 11 24.06	24.54	1,385.09	31 38 06.39		
220	Patten	88 11 34.48	34.47	2,049.21	299 49 24.28		
221	Cestor	34 37 02.08	00.99	2,436.95	154 27 05.83	35 13 44.726	90 04 06.052
		00.62	00.00				
220	Patten	67 26 12.19	13.71	2,049.21	299 49 24.28		
221	Cestor	62 00 27.29	28.50	2,450.50	57 49 36.34		
222	Lamberson	50 33 17.19	17.79	2,343.17	187 15 31.25	35 13 02.377	90 05 28.066
		56.67	00.00				
221	Cestor	34 14 16.00	17.26	2,450.50	57 49 36.34		
222	Lamberson	82 01 32.67	32.84	1,537.46	319 50 21.88		
223	Morrisey	63 44 10.10	09.90	2,706.18	203 34 54.38	35 12 24.246	90 04 48.865
		58.77	00.00				
222	Lamberson	72 21 13.90	13.53	1,537.46	319 50 21.88		
223	Morrisey	57 02 41.35	40.75	1.896.01	82 48 03.73		
224	Barton	50 36 06.93	05.72	1,669.49	212 11 15.14	35 12 16.530	90 06 03.230
		02.18	00.00				
223	Morrisey	100 54 05.52	07.28	1,896.01	82 48 03.73		
224	Barton	48 36 34.05	35.96	3,669.60	311 23 56.83		
225	"Frame's Chute."	30 29 16.12	16.76	*2,803.62	*161 54 16.29	*35 10 57.771	*90 04 14.438
		55.69	00.00				

*The azimuth and distance of line Barton, Frame's Chute and the co-ordinates of the extremities were received from the United States Lake Survey, and are assumed as correct.

B 1.

REPORT OF ASSISTANT ENGINEER G. Y. WISNER, UPON THE FINAL REDUCTION OF SECONDARY TRIANGULATION FROM CAIRO, ILLINOIS, TO MEMPHIS, TENNESSEE.

OFFICE MISSISSIPPI RIVER COMMISSION,
Saint Louis, Mo., July 21, 1881.

SIR: I have the honor to herewith submit the least square adjustment of the angles of triangulation from Cairo, Ill., to Memphis, Tenn., and also computation of lengths of sides and geodetic position of stations.

This system of triangulation is divided into six sections by seven lines, of which the lengths are known within reasonable limits, and with one exception the differences between the measured and computed lengths of these lines have the same sign, and this exception can probably be accounted for by the fact that a large percentage of the triangles close badly in this section.

An examination of the preliminary computation shows that a systematic error of some kind exists in the measured angles, having a tendency to produce an accumulative error in the computed lengths of lines, but not affecting the computed azimuths of the lines. An error of this character cannot be due to erroneous directions of the side lines of the system, as a constant error in direction of these lines, having a tendency to produce an accumulative error in the computed lengths, would also produce an error in the computed azimuth, and, consequently, the trouble must arise from errors in the cross lines of the system or the lines used as successive bases in computation of

the triangles. From a careful examination of the method of observation, I have no doubt but that the periodic errors due to the different instruments have been eliminated from the results, and that the only errors to which the instrumental work is subject are those which may arise from disturbance of the instrument and accidental errors in pointing, and as this class of errors is subject to the laws of chance they would have a tendency to eliminate themselves in the computation.

In regard to lateral refraction, it will be evident that, as the azimuth is not affected, the refraction, if it takes place in the side lines, must have contrary signs on opposite sides of the river, and, consequently, its effect would be practically eliminated in the computed lengths of lines. In order, then, to account for the discrepancies by lateral refraction, we have to assume that all the cross lines of the system are curved, with convex side down stream.

This assumption seems entirely too arbitrary, and by no means a satisfactory explanation of the trouble. Aside from the errors arising from observation and from atmospheric disturbances the only other apparent source to which the discrepancies can be attributed seems to be the targets. Errors from targets not being properly centered are accidental as to direction, and would probably be eliminated in a long system. The error, however, due to phase on octagonal targets would be eliminated as far as the side lines are concerned, and would produce an accumulative error from the cross lines of the same sign as that existing in the above triangulation.

On investigation it was found that in a portion of section two and in section four, five, and six, an octagonal target about three inches in diameter was used, being much larger than the targets used on the other sections. From the following table, giving the mean systematic correction on the different sections and the corresponding amount of phase on a target at the distance of a mile, it will be seen that on those sections where the large targets were used the maximum discrepancies occur:

Section.	Number of triangles.	Systematic correction.	Corresponding phase on target at one mile.
		″	*Inches.*
Island No. 1—State line	70	0.15	0.05
State line—Cottonwood Point	51	0.50	0.16
Cottonwood Point—Island No. 28	37	0.33	0.10
Island No. 28—Lanier	12	1.16	0.36
Lanier—Island No. 35	14	0.87	0.28
Island No. 35—Barton	41	0.57	0.18

From the last column of the above table it will be seen that the maximum correction corresponds to a mean phase of 0.36 inch on a mile line, or less than a thirty-degree projection of one of the faces of the target. These results do not prove that the errors are due to phase, but I think they establish a strong probability that such is the case.

The computation of the L. M. Z's have been made in two parts, having the Cottonwood base for common line, one part being computed from the astronomical determinations at Cairo, and the other from Memphis. The following table shows comparisons at north base, Cottonwood Point:

	Latitude north base.	Longitude north base.	Azimuth.
	° ′ ″	° ′ ″	° ′ ″
From observation at north base			46 24 56.98
Computed from Memphis	36 04 13.75	89 40 52.03	46 24 56.70
Computed from Cairo	36 04 13.65	89 40 52.71	46 24 47.61

The very close agreement of these results for latitude and longitude indicates that only a small amount of error can exist in the adopted distances; the only discrepancy exceeding the probable error of the astronomical determinations being the azimuth computed from Cairo.

The computations for the adjustment as well as for geodetic position are self-checking, and also as an additional check on their accuracy have been compared with the preliminary computations.

Very respectfully submitted.

GEO. Y. WISNER,
Assistant Engineer.

First Lieut. SMITH S. LEACH,
Secretary Mississippi River Commission.

APPENDIX C.

REPORT OF ASSISTANT ENGINEER J. A. PAIGE, UPON PRECISE LEVELING OPERATIONS BETWEEN COLUMBUS, KENTUCKY, AND MEMPHIS, TENNESSEE, 1879–'80.

OFFICE MISSISSIPPI RIVER COMMISSION,
Saint Louis, Mo., September 24, 1881.

SIR: I have the honor to make the following report of the operations of the party in my charge on precise levels during the field season of 1879–'80.

On October 25 I was directed to go to Mound City, Ill., fit out the quarter-boat Louisiana, employ a field party, proceed to Columbus, Ky., and carry the levels down the river, starting from bench-marks established there a previous season by General Comstock's parties of the Lake Survey. Columbus was reached November 4. The force was to be that of two complete field parties, each observer carrying a line separately. Mr. Frost, the other assistant, and his recorder, Mr. Sankee, did not join the party till December 15, at Hickman. The party then consisted of B. D. Frost and myself as observers, F. W. Stevens and E. H. Sankee as recorders, four rodmen, one cook, and eight axmen. Work was continued to Memphis, Tenn., arriving there on April 22, 1880.

During the winter the work was interrupted by high-water, and three gaps aggregating about 8 miles were left; one at Reelfoot, one at Ashport, and one at Fort Pillow. When the party arrived at Memphis, Assistant Frost, by your orders, was sent back to finish these stretches.

The length of the line by the levels is 108.5 miles; by the river, 228 miles. At Hale's Point an accident occurred to level No. 1, which necessitated its being sent to Saint Louis. Counting this delay, with that of Mr. Frost's arrival, at beginning of the season, the average strength of the force was that of about $1\frac{1}{2}$ field parties for the season. The route followed was generally along the river front except at bends, where the line was run across the point.

INSTRUMENTS.

Kern leveling instruments Nos. 1 and 2, with level vials Nos. 1 and 2, were used, and leveling rods Nos. 1, 2, 3, and 5.

A description of these instruments is found in Report of Chief of Engineers for 1877, page 1190.

The constants of the above instruments and the lengths of the rods are given on page 3 of the accompanying reduction.

The constants of level No. 2 were determined at the beginning and end of the season.

The difference of the two values of V of the level vial of this instrument was $0''.26$.

With a bubble run of 1 division, K being, say, 75^{m}, the displacements of the midwire on rod when reduced by these two values of V would differ by less than 0.1^{mm}.

The mean of the two values of V was adopted for the reduction of the season's notes of this instrument.

In level No. 1 the value of V was determined twice; once at Hickman and once at Ashport. The first value was used from Hickman to Ashport, and the second from Ashport to Memphis.

Between Hickman and Memphis p was determined for this instrument once.

Assistant Paige used level No. 2, and Assistant Frost level No. 1.

BENCH-MARKS.

Permanent bench-marks were established at an average distance apart of $3\frac{3}{4}$ miles. These consisted of a stone post of the usual dimensions set in the ground, with a copper bolt leaded in the top. Unfortunately, very high water prevailed during a large part of the season, which prevented the establishment of the benches far enough back from the river to insure their permanency for many years. The highest points were chosen in planting the stones, and the water being beyond the banks, this brought the benches pretty close to the river. A description of these bench-marks is given on pp. 63–66.

At the close of a day's work at least two temporary bench-marks were established, one of which was on the root of a tree, or something else equally as good. In the reduction of the notes the most reliable bench was taken, and no attention was paid to the other bench or benches, except to ascertain if any had been moved during the night or had been interfered with.

To show the relative accuracy when closing on a single bench and when on two or more benches:

Let R = probable error of the result of a fore and back sight at any instrument station, and let r = probable error of a single reading on the rod. Then for a single bench, $R = \sqrt{2\,r^2}$ (1), and for two benches, $R = \sqrt{r^2 + \frac{r^2}{2}}$.

Now, for a distance of 50^{m}, r = about 0.42^{mm}. Then, for a single bench, $R = \pm 0.59^{mm}$, and for two benches, $R = 0.51^{mm}$. Hence, but one bench was taken.

As to the foot-plates used with these instruments for turning-points, I do not consider them reliable. Take, for example, the surface after a rain. To establish the foot-plate equally as firm as a stake driven in the ground the earth should be removed as far as the water has penetrated (except, of course, in sand). This requires more time and labor than to drive a stake. And in running over a dry surface any movement of the rodman is more liable to disturb the foot-plate than the stake, as the foot-plate depends on, say, a depth of two inches for its stability where the stake is held by the earth, 8 inches or a foot under the surface. This is especially noticeable in running through the woods, where the surface stratum consists of the wood-mold usually found in forests.

METHODS OF REDUCTION AND EXPLANATION OF TABLES.

All methods, both of observation and reduction, were substantially the same as those detailed in the Report of the Chief of Engineers for 1880, page 2426.

Checks.

A field computation was made in note-books, with all corrections applied except the rod correction, and another independent computation made in the office. These were compared, and the corrected mean wire readings made to agree to 0.1^{mm}. The field computation was thus used as a check on the office computation, but the final elevations have been taken wholly from the latter.

Weight of observations.

All determinations have been given equal weight, regardless of the direction in which the line was run.

NOTE.—Nothing in the results here presented seems to justify the combining of the mean of north with mean of south lines, which would give excessive weight to one or the other where an equal number of lines was not run in each direction.

In the accompanying tables there are twenty-six cases where such a change in the method of weighting would affect the final mean, and of these, there are twelve where the odd direction gives a smaller residual than either of the others, from which it would seem that if there be any persistent discrepancy due to difference of direction, it must be much less than the errors of observation.

Rejected observations.

Three results have been rejected. One where the error was 1^m, one where it was 0.1^m, and one where it was about 40^{mm}. In all these cases there were two or more accordant results, the mean of which was used. The rejected results appear in the table of results, and are marked "rejected."

Rod correction.

The mean value of 1^m of the four rods is $999^{mm}.875$. The elevation of the initial point (P. B. M. 7) is $102^m.1226$. For every 1^m change of elevation from this plane, the determination by the rods is $0^{mm}.125$ too large, and is to be diminished by that amount. When the new elevation is *above* the initial point, the difference by the rods is too large, the elevation found is too high, and is to be *diminisked*. When the new elevation is *below* the initial point, the difference by the rods is again too large; the elevation found is therefore too low, and is to be *increased*.

Probable error.

The probable error for each stretch has been obtained directly from the several results according to the usual formula:

$$r = .6745\sqrt{\frac{\Sigma\, v^2}{m\,(m-1)}} \qquad (1)$$

When there are but two results, $m\,(m-1)=2$, and $\Sigma\, v^2=2v^2$. The formula then becomes

$$r = .6745\sqrt{v^2} = \tfrac{2}{3}v \text{ approximately.}$$

Or since v in this case is $\frac{1}{2}$ the difference between the two results, we have

$$r = \tfrac{1}{3} \text{ discrepancy.}$$

Therefore, where there were but two results between benches, $\frac{1}{3}$ their difference has been taken for the probable error for that stretch. When there were more than two results, the probable error was found by the formula.

For the probable error of the elevation of any given bench-mark, we have

$$R = \sqrt{\Sigma\, r^2}. \qquad (2)$$

where Σr^2 is the summation of the squares of all the partial probable errors between the given point and the initial point. It will be seen that the r here is the same as r in the previous formula.

In the table of results, r is given for each stretch and R for each permanent bench-mark.

Results.

The total length of line from Columbus to Memphis is $290.5^{km} = 180.5^{mi}$.

The probable error of the final result is 30.5^{mm}.

Since the probable error is assumed to increase with the square root of the distance, we have

$$\text{Probable error per kilometer} = \sqrt{\frac{30.5}{290.5}} = 1.79^{mm}.$$

Explanation of the table.

In the appended table of results *column* 1 gives the bench-mark, "T. B. M.," signifying temporary bench-mark, and "P. B. M.," permanent bench-mark.

Column 2 gives the distance in kilometers from P. B. M. 7 at Columbus.

Column 3 denotes the direction in which the line was run, "N" for North, and "S" for South.

Column 4 gives the several differences of elevation in meters found between the bench opposite and the preceding, together with the mean value, which was used. The plus sign indicates a higher, and the minus sign a lower elevation.

Column 5 is a column of residuals, being the amount each determination differs from the mean.

Column 6 shows the probable errors for the several stretches, which are obtained by treating the residuals of column 5 according to formula (1).

Column 7 gives the probable errors in the elevation of the several permanent benches as computed from P. B. M. 7 at Columbus. They are obtained by treating the quantities in column 6 according to formula (2).

Column 8 contains the elevations of the several benches, both temporary and permanent, given in column 1. They are obtained by adding, algebraically, the mean values in column 4, successively to the previous elevation in column 8.

Column 9 gives the rod corrections for each permanent bench.

Column 10 has the final corrected elevations of all the permaaent benches. They are obtained by adding the corresponding quantities in columns 8 and 9. These elevations are referred to a plane 290.84 feet below the zero of the U. S. Engineer's gauge at Cairo.

Very respectfully, your obedient servant,

JAMES A. PAIGE,
United States Assistant Engineer.

First Lieut. SMITH S. LEACH,
Secretary Mississippi River Commission.

CONSTANTS OF KERN LEVELS, NOS. 1 AND 2 (LAKE SURVEY).

[p = "pivot correction," or correction for inequality of telescope rings. It is the angular correction to be applied to the line of collimation to reduce it to the horizontal plane of the upper surface of the rings. v = value of one division of the bubble-tube in seconds of arc. L = length of a three-meter rod.]

No. of instrument.	Constant.	Date.	No. of observations.	Probable error.	Remarks.
	"			"	
1	$p = +0.32$	Jan. 7, 1880	5	±0.08	
1	$p = +2.85$?	June 26, 1880	5	±0.23	Observations not well taken.
1	$p = +0.112$	Oct. 24, 1881	5	±0.015	
2	$p = +3.52$	Nov. 6, 1879	14	±0.16	
2	$p = +3.47$	June 26, 1880	4	±0.21	
1	$v = 2.706$	Dec. 21, 1879	88	±0.030	
1	$v = 2.206$	Feb. 26, 1880	22	±0.094	
1	$v = 2.55$	June 23, 1880	39	±0.070	
2	$v = 3.968$	Nov. 7, 1879	25	±0.005	
2	$v = 4.23$	June 21, 1880	55	±0.120	
	mm				
Rod I	L = 2999.540				Mean of Lake Survey determinations and those in office of Mississippi River Commission.
Rod II	L = 2999.599				
Rod III	L = 2999.687				
Rod	L = 2999.671				
Mean	L = 2999.624				

RESULTS OF PRECISE LEVELING, COLUMBUS TO MEMPHIS.

Bench.	Distance.	Direction.	Difference of elevation.	V.	r.	R.	Elevation.	Rod corr'n.	Corrected elevation.
	Km.		*M.*	*Mm.*	*Mm.*	*Mm.*	*M.*	*Mm.*	*M.*
P. B. M. 7							102.1226		*102.1226
P. B. M. 8	0.52	S.	− 2.2092	+ 0.4	0.2	0.2	99.9138	+0.3	99.9141
		S.	− 2.2085	− 0.3					
		Mean.	2.2088						
T. B. M. 8	390.	S.	+ 3.7627	−15.5	6.9	.....	103.6560	.....	.....
		N.	+ 3.7712	−29.0					
		S.	+ 3.7366	+ 5.6					
		N.	+ 3.7180	+24.2					
		S.	+ 3.7571	−14.9					
		N.	+ 3.7075	+34.7					
		Mean.	+ 3.7422						
T. B. M. 9	4.29	N.	+39.5905	− 1.7	1.7	.....	143.2448	.....	.....
		S.	+39.5890	− 0.2					
		N.	+39.5818	+ 7.0					
		S.	+39.5941	− 5.3					
		Mean.	+39.5888						
P. B. M. 10	5.34	S.	+ .6914	− 2.2	1 6	7.3	143.9340	−5.5	143.9285
		N.	+ .6826	+ 6.6					
		S.	+ .6885	+ 0.7					
		N.	+ .6945	− 5.3					
		Mean	+ .6892						
T. B. M. 23	6.96	S.	−44.6999	− 2.8	1.8	.....	99.2313	.....	.....
		S.	−44.7055	+ 2.8					
		Mean.	−44.7027						
T. B. M. 25	9.02	S.	− .6945	+ 4.8	3.2	.....	98.5416	.....	.....
		S.	− .6849	− 4.8					
		Mean.	− .6897						
P. B. M. 11	11.45	S.	+ 1.0084	+ 2.2	1.2	8.2	99.5522	+0.3	99.5525
		S.	+ 1.0090	+ 1.6					
		S.	+ 1.0143	− 3.7					
		Mean.	+ 1.0106						
T. B. M. 33	14.77	S.	− 2.3125	− 3.2	2.1	.....	97.2365	.....	.....
		S.	− 2.3189	+ 3.2					
		Mean.	− 2.3157						
P. B. M. 12	15.47	N.	+ 1.1620	− 2.9	4 3	9.5	98.3956	+0.5	98.3961
		S.	+ 1.1468	+12.3					
		S.	+ 1.1684	− 9.3					
		Mean.	+ 1.1591						
T. B. M. 37	16.50	S.	− .6333	− 2.7	2.0	.....	97.7596	.....	.....
		S.	− .6420	+ 6.0					
		S.	− .6326	− 3.4					
		Mean.	− .6360						
T. B. M. 40	19.60	S.	− 4.9282	− 4.2	2.8	.....	92.8272	.....	.....
		S.	− 4.9365	+ 4.1					
		Mean.	− 4.9324						
T. B. M. 45	20.51	S.	+ .7224	+ 5.2	3.4	.....	93.5548	.....	.....
		N.	+ .7327	− 5.1					
		Mean.	+ .7276						
P. B. M. 13	20.94	S.	+ 4.4054	− 0.4	0.2	10.7	97.9598	+0.5	97.9603
		N.	+ 4.4047	+ 0.3					
		Mean.	+ 4.4050						

* Elevation of P. B. M. 7 determined by United States Lake Survey in 1876. It is referred to a datum plane 290.84 feet below the zero of the United States Engineer's gauge, at Cairo, Ill.

Results of precise leveling, Columbus to Memphis—Continued.

Bench.	Distance.	Direction.	Difference of elevation.	V.	r.	R.	Elevation.	Rod corr'n.	Corrected elevation.
	Km.		*M.*	*Mm.*	*Mm.*	*Mm.*	*M.*	*Mm.*	*M.*
T. B. M. 47	22.08	S.	− .5441	+ 2.1	1.4	.....	97.4178	.....	.....
		N.	− .5400	− 2.0					
		Mean.	− .5420						
T. B. M. 50	25.22	S.	− 1.8733	+ 7.1	4.8	.....	95.5516	.....	.....
		N.	− 1.8590	− 7.2					
		Mean.	− 1.8662						
T. B. M. 52	26.05	S.	+ 3.5429	+ 1.2	3.7	.....	99.0957	.....	.....
		N.	+ 3.5541	−10.0					
		S.	+ 3.5353	+ 8.8					
		Mean.	+ 3.5441						
P. B. M. 14	26.46	S.	+16.7691	− 1.6	1.1	12.4	115.8632	−1.7	115.8615
		N.	+16.7659	+ 1.6					
		Mean.	+16.7675						
P. B. M. 15		S.	−15.2949			12.4	100.5683	−1.0	100.5673
T. B. M. 65	28.68	S.	−17.6002	+10.8	7.2	.....	98.2738	.....	.....
		N.	−17.5787	−10.7					
		Mean.	−17.5894						
P. B. M. 16	33.14	S.	− .4765	+ 6.1	4.1	14.9	97.8034	+0.5	97.8039
		N.	− .4642	− 6.2					
		Mean.	− .4704						
T. B. M. 76	34 24	S.	− .7579	+ 2.9	2.2	.....	97.0484	.....	.....
		N.	− .7485	− 6.5					
		N.	− .7587	+ 3.7					
		Mean.	− .7550						
T. B. M. 80	37.29	S.	+ .3342	+ 2.6	1.7	.....	97.3852	.....	.....
		N.	+ .3394	− 2.6					
		Mean.	+ .3368						
T. B. M. 83	38.80	S.	− 1.2934	+ 3.3	2.2	.....	96.0951	.....	.....
		N.	− 1.2868	− 3.3					
		Mean.	− 1.2901						
T. B. M. 84	39.88	S.	+ .9945	+ 5.8	2.1	.....	97.0954	.....	.....
		N.	+ 1.0055	− 5.2					
		N.	+ 1.0009	− 0.6					
		Mean.	+ 1.0003						
P. B. M. 17	41.64	S.	− .3747	+ 3.4	2.3	15.7	96.7241	+0.7	96.7248
		N.	− .3679	− 3.4					
		Mean.	− .3713						
T. B. M. 93	43.62	S.	+ .0545	+ 2.9	2.0	.....	96.7815	.....	.....
		S.	+ .0604	− 3.0					
		Mean.	+ .0574						
T. B. M. 95	45.99	S.	− .3126	+10.9	6.5	.....	96.4798	.....	.....
		S.	− .3027	+ 1.0					
		S.	− .2899	−11.8					
		Mean.	− .3017						
P. B. M. 18	46.67	S.	− .4731	+ 0.9	0.6	17.1	96.0076	+0.8	96.0084
		N.	− .4712	− 1.0					
		Mean.	− .4722						

Results of precise leveling, Columbus to Memphis—Continued.

Bench.	Distance.	Direction.	Difference of elevation.	V.	r.	R.	Elevation.	Rod corr'n.	Corrected elevation.
	Km.		*M.*	*Mm.*	*Mm.*	*Mm.*	*M.*	*Mm.*	*M.*
T. B. M. 101	47.77	N.	− .1807	− 8.9	5.9	.....	95.8180	.....	.....
		S.	− .1985	+ 8.9					
		Mean.	− .1896						
T. B. M. 99	49.77	N.	+ .8016	−10.9	3.2	.....	96.6087	.....	.....
		S.	+ .7743	+16.4					
		N.	+ .7961	− 5.4					
		Mean.	+ .7907						
T. B. M. 98	52 74	N.	− .4610	− 5.4	3.0	.....	96.1423	.....	.....
		S.	− .4761	+ 9.7					
		N.	− .4621	− 4.3					
		Mean.	− .4664						
P. B. M. 19	53.04	S.	+ 0.1970	+ 1.3	2.6	18.8	96.3406	+0.8	96.3414
		N.	+ 2056	− 7.3					
		N.	+ .1922	+ 6.1					
		Mean.	+ .1983						
T. B. M. 102	54.99	S.	− .2111	− 1.3	2.3	.....	96.1282	.....	.....
		S.	− .2191	+ 6.7					
		S.	− .2069	− 5.5					
		Mean.	− .2124						
T. B. M. 105	56.63	S.	− .9566	− 1.0	0.7	.....	95.1706	.....	.....
		S.	− .9586	+ 1.0					
		Mean.	− .9576						
P. B. M. 20	58.50	S.	+ .6493	+ 1.7	1.1	19.0	95.8216	+0.8	95.8224
		N.	+ .6526	− 1.6					
		Mean.	+ .6510						
P. B. M. 21	61.86	S.	− .3482	+12.6	8.4	20.7	95.4860	+0.8	95.4868
		N.	− .3229	−12.7					
		Mean.	− .3356						
T. B. M. 21 D	64.23	S.	− .3975	+ 6.1	4.1	.....	95.0946	.....	.....
		S.	− .3852	− 6.2					
		Mean.	− .3914						
T. B. M. 21 G	67.26	S.	+ 5.0922	+10.1	4.8	.....	100.1969	.....	.....
		S.	+ 5.1161	−13.8					
		S.	+ 5.0985	+ 3.8					
		Mean.	+ 5.1023						
T. B. M. 2 L	71.87	S.	− .9536	+ 3.3	2.2	.....	99.2466	.....	.....
		S.	− .9470	− 3.3					
		Mean.	− .9503						
P. B. M. 22	75.24	S.	− 4.7555	+ 1.9	1.2	21.8	94.4930	+0.9	94.4939
		S.	− 4.7518	− 1.8					
		Mean.	− 4.7536						
P. B. M. 23	75.94	S.	+ 1.7050	+ 0.5	1.2	.....	96.1985	+0.8	96.1993
		N.	+ 1.7088	− 3.3					
		S.	+ 1.7026	+ 2.9					
		Mean.	+ 1.7055						
T. B. M. 117	79.91	S.	− 4.0771	− 4.5	3.0	.....	92.1169	.....	.....
		S.	− 4.0862	+ 4.6					
		Mean.	− 4.0816						

Results of precise leveling, Columbus to Memphis—Continued.

Bench.	Distance.	Direction.	Difference of elevation.	V.	r.	R.	Elevation.	Rod corr'n.	Corrected elevation.
	Km.		*M.*	*Mm.*	*Mm.*	*Mm.*	*M.*	*Mm.*	*M.*
T. B. M. 118	81.17	S.	— .5640	+ 1.7	0.9	.....	91.5546	.....	.....
		N.	— .5597	— 2.6					
		S.	— .5633	+ 1.0					
		Mean	— .5623						
P. B. M. 24	83.44	S.	— .1243	+ 2.8	1.9	22.2	91.4331	+1.4	91.4345
		N.	— .1187	— 2.8					
		Mean	— .1215						
T. B. M. 24 B	85.77	S.	+ .1984	— 2.7	1.8	.....	91.6288	.....	.....
		S.	+ .1930	+ 2.7					
		Mean	+ .1957						
P. B. M. 25	87.17	S.	+ .0356	+ 5.8	3.9	22.6	91.6702	+1.3	91.6715
		N.	+ .0473	— 5.9					
		Mean	+ .0414						
T. B. M. 25 C	89.60	S.	— .7607	— 5.5	3.7	.....	90.9040	.....	.....
		N.	— .7717	+ 5.5					
		Mean	— .7662						
T. B. M. 131	93.50	S.	— 1.8795	+ 4.1	2.7	.....	89.0286	.....	.....
		S.	— 1.8714	— 4.0					
		Mean	— 1.8754						
T. B. M. 133	94.43	S.	+ .6994	+ 0.5	0.2	.....	89.7285	.....	.....
		N.	+ .6996	+ 0.3					
		S.	+ .7006	— 0.7					
		Mean	+ .6999						
T. B. M. 124	95.09	S.	+ .9168	+ 0.2	0.1	.....	90.6455	.....	.....
		N.	+ .9172	— 0.2					
		Mean	+ .9170						
P. B. M. 26	97.68	S.	+ .2175	— 1.5	1.0	23.1	90.8615	+1.4	90.8629
		N.	+ .2144	+ 1.6					
		Mean	+ .2160						
T. B. M. 26 A	99.24	S.	— .3301	+ 6.8	1.3	.....	90.5382	.....	.....
		S.	— .3214	— 1.9					
		N.	— .3189	— 4.4					
		S.	— .3258	+ 2.5					
		S.	— .3204	— 2.9					
		Mean	— .3233						
T. B. M. 26 B	100.24	S.	— 1.0655	+ 1.3	0.8	.....	89.4740	.....	.....
		S.	— 1.0630	— 1.2					
		Mean	— 1.0642						
T. B. M. 26 E	101.71	S.	— .4158	+ 7.8	1.3	.....	89.0660	.....	.....
		S.	— .4016	— 6.4					
		S.	— .4095	+ 1.5					
		S.	— .4053	— 2.7					
		Mean	— .4080						
T. B. M. 26 H	102.88	S.	+ .1888	+ 5.2	1.2	.....	89.2600	.....	.....
		S.	+ .1972	— 3.2					
		S.	+ .1955	— 1.5					
		N.	+ .1943	— 0.3					
		Mean	+ .1940						

Results of precise leveling, Columbus to Memphis—Continued.

Bench.	Distance.	Direction.	Difference of elevation.	V.	r.	R.	Elevation.	Rod corr'n.	Corrected elevation.
	Km.		*M.*	*Mm.*	*Mm.*	*Mm.*	*M.*	*Mm.*	*M.*
T. B. M. 26 I	104.14	S.	— 1.3075	+ 3.0	1.0	.....	87.9555	.....	.....
		S.	— 1.3003	— 4.2					
		S.	— 1.3055	+ 1.0					
		N.	(— 1.3495)	Reject.					
		S.	— 1.3046	+ 0.1					
		Mean.	— 1.3045						
T. B. M. 26 J	104.98	S.	+ .3896	+ 5.2	1.4	.....	88.3503	.....	.....
		S.	+ .3938	+ 1.0					
		S.	+ .4004	— 5.6					
		N.	+ .3952	— 0.4					
		Mean.	+ .3948						
T. B. M. 135	106.94	S.	— .2498	— 1.4	0.9	.....	88.0991	.....	.....
		S.	— .2526	+ 1.4					
		Mean.	— .2512						
T. B. M. 137	108.40	S.	— .2018	— 0.6	0.4	.....	87.8967	.....	.....
		S.	— .2031	+ 0.7					
		Mean.	— .2024						
T. B. M. 140	110.35	S.	— .6880	+ 2.0	1.4	.....	87.2107	.....	.....
		S.	— .6839	— 2.1					
		Mean.	— .6860						
P. B. M. 27	110.89	S.	+ 1.3050	0.0	0.0	23.3	88.5157	+1.7	88.5174
		S.	+ 1.3051	+ 0.1					
		Mean.	+ 1.3050						
T. B. M. 143	113.33	S.	— .5568	+ 4.2	2.8	.....	87.9631	.....	.....
		S.	— .5484	— 4.2					
		Mean.	— .5526						
T. B. M. 152	115.73	S.	— .1551	— 5.5	3.7	.....	87.8025	.....	.....
		N.	— .1661	+ 5.5					
		Mean.	— .1606						
P. B. M. 28	117.93	S.	+ .5984	— 5.0	3.3	24.0	88.4059	+1.7	88.4076
		N.	+ .6083	+ 4.9					
		Mean.	+ .6034						
T. B. M. 155	118.44	S.	— .0066	— 1.9	1.3	.....	88.3974	.....	.....
		S.	— .0104	+ 1.9					
		Mean.	— .0085						
T. B. M. 158	122.38	S.	— 1.0481	+ 8.5	3.4	.....	87.3578	.....	.....
		N.	— 1.0401	— .5					
		S.	— 1.0305	— 9.1					
		Mean.	— 1.0396						
T. B. M. 161	123.74	S.	+ .2371	+ 4.8	3.2	.....	87.5997	.....	.....
		S.	+ .2467	— 4.8					
		Mean.	+ .2419						
P. B. M. 29	124.67	S.	— 1.2199	+ 2.3	1.6	24.5	86.3821	+2.0	86.3841
		N.	— 1.2152	— 2.4					
		Mean.	— 1.2176						
T. B. M. 164	126.93	S.	+ 1.1609	— 3.7	2.5	.....	87.5467	.....	.....
		S.	+ 1.1684	+ 3.8					
		Mean.	+ 1.1646						

Results of precise leveling, Columbus to Memphis—Continued.

Bench.	Distance.	Direction.	Difference of elevation.	V.	r.	R.	Elevation.	Rod corr'n.	Corrected elevation.
	Km.		*M.*	*Mm.*	*Mm.*	*Mm.*	*M.*	*Mm.*	*M.*
T. B. M. 168.....	130.69	S.	− .6589	− 6.2	4.1	.....	86.8816	.....	.....
		S.	− .6713	+ 6.2					
		Mean.	− .6651						
T. B. M. 169.....	131.66	S.	+ .3458	+ 5.3	1.7	.....	87.2327	.....	.....
		S.	+ .3543	− 3.2					
		S.	+ .3532	− 2.1					
		Mean.	+ .3511						
P. B. M. 30.....	131.88	S.	− .9527	+ 0.9	0.6	25.0	86.2809	+2.0	86.2829
		S.	− .9509	− 0.9					
		Mean.	− .9518						
T. B. M. 174.....	136.21	S.	+ .0298	+ 2.3	1.5	.....	86.3130	.....	.....
		S.	+ .0344	− 2.3					
		Mean.	+ .0321						
T. B. M. 175.....	136.70	S.	+ .2263	+ 3.4	2.3	.....	86.5427	.....	.....
		S.	+ .2330	− 3.3					
		S.	+ .2298	− 0.1					
		Mean.	+ .2297						
P. B. M. 31	138.35	S.	− .0443	+ 5.1	3.4	25.4	86.5035	+2.0	86.5055
		S.	− .0341	− 5.1					
		Mean.	− .0392						
P. B. M. 32.....	144.84	S.	− 1.0425	+ 4.3	2.9	25.6	85.4653	.....	.....
		S.	− 1.0338	− 4.4					
		Mean.	+1.0382						
T. B. M. 184.....	146.26	S.	+ .0592	− 1.0	0.6	.....	85.5235	.....	.....
		S.	− .0573	+ 0.9					
		Mean.	+ .0582						
T. B. M. 185.....	147.50	S.	+ 0.0330	+ 3.7	1.3	.....	85.5602	.....	.....
		S.	+ .0374	− 0.7					
		S.	+ .0397	− 3.0					
		Mean.	+ .0367						
T. B. M. 188.....	150.26	S.	− .7407	+ 2.9	1.9	.....	84.8224	.....	.....
		S.	− .7349	− 2.9					
		Mean.	− .7378						
P. B. M. 33.....	151.44	S.	+ .3867	− 2.9	2.0	25.8	85.2062	+2.1	85.2081
		S.	+ .3808	+ 3.0					
		Mean.	+ .3838						
T. B. M. 193.....	154.90	S.	− 1.5748	+ 4.4	3.0	.....	83.6358	.....	.....
		S.	− 1.5659	− 4.5					
		Mean.	− 1.5704						
T. B. M. 194.....	155.95	S.	− .1836	+ 5.9	2.0	.....	83.4581	.....	.....
		N.	− .1754	− 2.3					
		S.	− .1741	− 3.6					
		Mean.	− .1777						
P. B. M. 34.....	157.12	S.	+ .3087	+ 2.5	1.7	26.1	83.7693	+2.3	83.7716
		N.	+ .3138	− 2.6					
		Mean.	+ .3112						
T. B. M. 198.....	158.06	S.	+ .1051	+ 1.2	0.8	.....	83.8756	.....	.....
		N.	+ .1075	− 1.2					
		Mean.	+ .1063						

Results of precise leveling, Columbus to Memphis—Continued.

Bench.	Distance.	Direction.	Difference of elevation.	V.	r.	R.	Elevation.	Rod corr'n.	Corrected elevation.
	Km.		*M.*	*Mm*	*Mm.*	*Mm.*	*M.*	*Mm.*	*M.*
T. B. M. 199	158.72	S.	— .2089	+ 2.5	2.6	.....	83.6692	.....	.....
		S.	-- .2089	+ 2.5					
		N.	— .2014	— 5.0					
		Mean.	— .2064						
P. B. M. 35	161.63	S.	+ .3141	+ 3.9	2.6	26.4	83.9872	+2.3	83.9895
		N.	+ .3219	— 3.9					
		Mean.	+ .3180						
East B. M	162.97	S.	— .2829	— 2.9	2.0	.....	83.7014	.....	.....
		N.	— .2888	+ 3.0					
		Mean.	— .2858						
West B. M	163.32	S.	+ .5747	— 0.8	0.5	.....	84.2753	.....	.....
		S.	+ .5731	+ 0.8					
		Mean.	+ .5739						
T. B. M. 35 C	164.21	S.	— .5301	+ 1.1	0.7	.....	83.7463	.....	.....
		S.	(— 1.5349)	Reject.					
		S.	— .5279	— 1.1					
		Mean.	— .5290						
T. B. M. 35 E	166.33	S.	— .1112	+ 1.4	0.9	.....	83.6365	.....	.....
		S.	— .1084	— 1.4					
		Mean.	— .1098						
East B. M. 2	166.58	S.	— .1931	+ 0.8	0.5	.....	83.4442	.....	.....
		S.	— .1915	— 0.8					
		Mean.	— .1923						
P. B. M. 36	166.70	S.	+ .2377	0.0	0.0	26.5	83.6819	+2.3	83.6842
		S.	+ .2377	0.0					
		Mean.	+ .2377						
T. B. M. 211	170.25	S.	— .7418	+ 7.6	5.1	.....	82.9477	.....	.....
		S.	— .7266	— 7.6					
		Mean.	— .7342						
T. B. M. 212	170.97	S.	+ .4574	+ 6.5	2.1	.....	83.4116	.....	.....
		N.	+ .4679	— 4.0					
		N.	+ .4663	— 2.4					
		Mean.	+ .4639						
P. B. M. 37	172.93	S.	+ .1803	+14.3	3.4	27.3	83.6062	+2.3	83.6085
		N.	+ .2043	— 9.7					
		N.	+ .1946	0.0					
		N.	+ .1990	— 4.4					
		Mean.	+ .1946						
T. B. M. 216	174.65	S.	— .8228	+ 3.3	2.2	.....	82.7867	.....	.....
		N.	— .8162	— 3.3					
		Mean.	— .8195						
T. B. M. 222	177.56	S.	— .3218	— 2.4	1.6	.....	82.4625	.....	.....
		S.	— .3267	+ 2.5					
		Mean.	— .3242						
T. B. M. 224	179.80	S.	— .2376	+ 0.7	0.5	.....	82.7008	.....	.....
		S.	+ .2390	— 0.7					
		Mean.	+ .2383						

Results of precise leveling, Columbus to Memphis—Continued.

Bench.	Distance.	Direction.	Difference of elevation.	V.	r.	R.	Elevation.	Rod corr'n.	Corrected elevation.
	Km.		*M.*	*Mm.*	*Mm.*	*Mm.*	*M.*	*Mm.*	*M.*
P. B. M. 38	181.17	S.	— .0864	+ 6.8	2.9	27.5	82.6212	+2.4	82.6236
		S.	— .0809	+ 1.3					
		N.	— .0716	— 8.0					
		Mean.	— .0796						
T. B. M. 227	183.35	S.	— .3422	+ 1.7	1.1	.....	82.2807	.....	.....
		S.	— .3388	— 1.7					
		Mean.	— .3405						
T. B. M. 228	184.65	S.	+ .2497	+ 7.6	2.5	.....	82.5380	.....	.....
		S.	+ .2601	— 2.8					
		N.	+ .2621	— 4.8					
		Mean.	+ .2573						
T. B. M. 229	185.56	S.	— .5174	+ 2.6	1.7	.....	82.0232	.....	.....
		S.	— .5122	— 2.6					
		Mean.	— .5148						
T. B. M. 231	186.63	S.	— .0907	+ 1.5	0.3	.....	81.9340	.....	.....
		S.	— .0879	— 1.3					
		S.	— .0890	— 0.2					
		Mean	— .0892						
P. B. M. 39	188.13	S.	+ .1737	+ 0.2	0.1	26.3	82.1079	+2.5	82.1104
		S.	+ .1741	— 0.2					
		Mean.	+ .1739						
T. B. M. 233	189.44	S.	— .0020	— 3.0	2.0	.....	82.1029	.....	.....
		S.	— .0081	+ 3.1					
		Mean.	— .0050						
T. B. M. 234	191.01	S.	— .4051	— 5.1	1.7	.....	81.6927	.....	.....
		S.	— .4138	+ 3.6					
		S.	— .4117	+ 1.5					
		Mean.	— .4102						
T. B. M. 235	192 72	S.	— .4932	+ 5.4	3.6	.....	81.2049	.....	.....
		S.	— .4825	— 5.3					
		Mean.	— .4878						
P. B. M. 40	194.35	S.	+ .2507	— 1.1	0.7	26.7	81.4545	+2.6	81.4571
		S.	+ .2485	+ 1.1					
		Mean.	+ .2496						
T. B. M. 237	195 40	S.	— .3605	— 3.5	2.3	.....	81.0905	.....	.....
		S.	— .3675	+ 3.5					
		Mean.	— .3640						
T. B. M. 238	196.42	S.	+ .5876	+ 6.0	2.0	.....	81.6841	.....	.....
		S.	+ .5972	— 3.6					
		S.	+ .5961	— 2.5					
		Mean.	+ .5936						
T. B. M. 240	198.95	S.	— .9014	— 1.8	1.2	.....	80.7809	.....	.....
		S.	— .9050	+ 1.8					
		Mean.	— .9032						
T. B. M. 508	201.12	N.	— 1.0838	+ 1.0	0.7	.....	79.6981	.....	.....
		S.	— 1.0818	— 1.0					
		Mean.	— 1.0828						

Results of precise leveling, Columbus to Memphis—Continued.

Bench.	Distance.	Direction.	Difference of elevation.	V.	r.	R.	Elevation.	Rod corr'n.	Corrected elevation.
	Km.		*M.*	*Mm.*	*Mm.*	*Mm.*	*M.*	*Mm.*	*M.*
T. B. M. 506	202.59	S.	— .3458	+ 1.5	1.0	.....	79.3538	.....	.....
		N.	— .3428	— 1.5					
		Mean.	— .3443						
T. B. M. 503	203.65	N.	— .2657	+ 3.9	1.3	.....	79.0920	.....	.....
		S.	— .2606	— 1.2					
		S.	— .2591	— 2.7					
		Mean.	— .2618						
P. B. M. 41	204.73	S.	+ 4.3915	+ 1.3	0.8	26.9	83.4848	+2.4	83.4872
		N.	+ 4.3940	— 1.2					
		Mean.	+ 4.3928						
T. B. M. 244	207.01	S.	+ 5.2558	+ 2.0	1.3	.....	88.7426	.....	.....
		N.	+ 5.2598	— 2.0					
		Mean.	+ 5.2578						
T. B. M. 246	208.90	S.	+ 3.0251	— 2.3	1.5	.....	91.7654	.....	.....
		S.	+ 3.0206	+ 2.2					
		Mean.	+ 3.0228						
T. B. M. 248	209.84	S.	+34.2677	+ 4.3	2.9	.....	126.0374	.....	.....
		S.	+34.2763	— 4.3					
		Mean.	+34.2720						
T. B. M. 249	210.36	S.	— 4.8520	+ 6.1	2.0	.....	121.1915	.....	.....
		S.	— 4.8429	— 3.0					
		S.	— 4.8429	— 3.0					
		Mean.	— 4.8459						
T. B. M. 252	211.77	S.	—35.6769	+ 2.9	1.9	.....	85.5175	.....	.....
		S.	—35.6712	— 2.8					
		Mean.	—35.6740						
P. B. M. 42	214.54	S.	+11.5300	+ 1.4	0.9	27.3	97.0489	+0.6	97.0495
		S.	+11.5327	— 1.3					
		Mean.	+11.5314						
P. B. M. 43	215.41	S.	—15.7281	+ 4.1	2.8	27.5	81.3249	+2.6	81.3275
		S.	—15.7198	— 4.2					
		Mean.	—15.7240						
T. B. M. 258	217.58	S.	— 1.0003	+ 3.5	2.0	.....	80.3281	.....	.....
		S.	— .9993	+ 2.5					
		S.	— .9908	— 6.0					
		Mean.	— .9968						
T. B. M. 259	218.81	S.	+ .3275	+ 6.8	2.7	.....	80.6624	.....	.....
		S.	+ .3417	— 7.4					
		S.	+ .3337	+ 0.6					
		Mean.	+ .3343						
P. B. M. 44	220.12	S.	— .3531	— 0.7	0.4	27.7	80.3086	+2.8	80.3114
		S.	— .3544	+ 0.6					
		Mean.	— .3538						
T. B. M. 262	221.34	S.	— .0172	+ 2.4	1.6	.....	80.2938	.....	.....
		S.	— .0125	— 2.3					
		Mean.	— .0148						

Results of precise leveling, Columbus to Memphis—Continued.

Bench.	Distance.	Direction.	Difference of elevation.	V.	r.	R.	Elevation.	Rod corr'n.	Corrected elevation.
	Km.		*M.*	*Mm.*	*Mm.*	*Mm.*	*M.*	*Mm.*	*M.*
T. B. M. 263	222.34	S.	− .4339	+ 1.5	2.9	.....	79.8614	.....	.....
		S.	− .4242	− 8.2					
		S.	− .4390	+ 6.6					
		Mean.	− .4324						
P. B. M. 45	223.59	S.	+ .2041	+ 0.7	0.5	27.9	80.0662	+2.8	80.0690
		S.	+ .2056	− 0.8					
		Mean.	+ .2048						
T. B. M. 267	225.91	S.	+ 6.2579	− 2.1	1.4	.....	86.3220	.....	.....
		S.	+ 6.2537	+ 2.1					
		Mean.	+ 6.2558						
T. M. B. 268	226.26	S.	− .6762	− 1.3	0.6	.....	85.6445	.....	.....
		S.	− .6796	+ 2.1					
		N.	− .6766	− 0.9					
		Mean.	− .6775						
P. B. M. 46	226.91	S.	+24.6960	+ 0.5	0.3	27.9	110.3410	−1.0	110.3400
		S.	+24.6970	− 0.5					
		Mean.	+24.6965						
P. B. M. 47	227.43	S.	+15.3997	+ 0.3	0.2	27.9	125.7410	−2.9	125.7381
		S.	+15.4004	− 0.4					
		Mean.	+15.4000						
T. B. M. 275	230.68	S.	−20.1038	+ 6.4	4.3	.....	105.6436	.....	.....
		S.	−20.0909	− 6.5					
		Mean.	−20.0974						
P. B. M. 48	235.62	S.	−26.1894	+ 8.1	5.4	28.8	79.4623	+2.9	79.4652
		S.	−26.1732	− 8.1					
		Mean.	−26.1813						
T. B. M. 283	239.77	S.	− 1.3352	+ 2.8	1.9	.....	78.1299	.....	.....
		S.	− 1.3296	− 2.8					
		Mean.	− 1.3324						
T. B. M. 284	240.92	S.	+ .4769	+ 6.8	2.4	.....	78.6136	.....	.....
		S.	+ .4897	− 6.0					
		S.	+ .4845	− 0.8					
		Mean.	+ .4837						
P. B. M. 49	242.14	S.	− .2839	− 0.7	0.4	28.9	78.3290	+3.0	78.3320
		S.	− .2852	+ 0.6					
		Mean.	− .2846						
P. B. M. 50	245.58	S.	− .2184	+ 2.8	1.9	29.0	78.1134	+3.0	78.1164
		S.	− .2127	− 2.9					
		Mean.	− .2156						
P. B. M. 51	248.95	S.	+ .0257	+ 2.9	1.9	29.1	78.1420	+3.0	78.1450
		S.	+ .0314	− 2.8					
		Mean.	+ .0286						
T. B. M. 293	249.65	S.	− .0014	− 0.2	0.1	.....	78.1404	.....	.....
		S.	− .0018	+ 0.2					
		Mean.	− .0016						
T. B. M. 294	250.87	S.	− .1185	− 2.0	1.3	.....	78.0199	.....	.....
		S.	− .1244	+ 3.9					
		N.	− .1186	− 1.9					
		Mean.	− .1205						

Results of precise leveling, Columbus to Memphis—Continued.

Bench.	Distance.	Direction.	Difference of elevation.	V.	r.	R.	Elevation.	Rod corr'n.	Corrected elevation.
	Km.		*M.*	*Mm.*	*Mm.*	*Mm.*	*M.*	*Mm.*	*M.*
T. B. M. 295.....	251.85	S.	— .3055	— 3.9	1.2	.....	77.7105	.....	.....
		S.	— .3072	— 2.2					
		S.	— .3135	+ 4.1					
		N.	— .3113	+ 1.9					
		Mean.	— .3094						
T. B. M. 296.....	252.93	S.	— .0020	— 1.9	1.3	.....	77.7066	.....	.....
		S.	— .0059	+ 2.0					
		Mean.	— .0039						
T. B. M. 297.....	253.56	S.	— .8045	+ 2.4	0.9	.....	76.9045	.....	.....
		S.	— .8000	— 2.1					
		N.	— .8019	— 0.2					
		Mean.	— .8021						
P. B. M. 52.....	254.31	S.	— .1115	— 0.7	0.5	29.2	76.7923	+3.2	76.7955
		N.	— .1130	+ 0.8					
		Mean.	— .1122						
T. B. M. 304.....	258.29	S.	— 1.0554	+ 4.8	3.2	.....	77.7417	.....	.....
		S.	— 1.0458	— 4.8					
		Mean.	— 1.0506						
T. B. M. 305.....	259.30	S.	— .0995	+ 6.3	2.3	.....	75.6485	.....	.....
		S.	— .0943	+ 1.1					
		N.	— .0833	— 9.9					
		S.	— .0957	+ 2.5					
		Mean.	— .0932						
T. B. M. 306.....	260.12	S.	— .8052	— 2.5	1.1	.....	74.8408	.....	.....
		S.	— .8107	+ 3.0					
		S.	— .8071	— 0.6					
		Mean.	— .8077						
P. B. M. 53.....	261.43	S.	+ .2947	+ 0.4	0.3	20.4	75.1359	+3.4	75.1393
		S.	+ .2955	— 0.4					
		Mean.	+ .2951						
T. B. M. 310.....	262.23	S.	— .0887	+ 2.6	2.1	.....	75.0498	.....	.....
		S.	— .0900	+ 3.9					
		S.	— .0796	— 6.5					
		Mean.	— .0861						
T. B. M. 311.....	263.26	S.	— .2604	+ 0.8	0.5	.....	74.7902	.....	.....
		S.	— .2589	— 0.7					
		Mean.	— .2596						
T. B. M. 312.....	264.14	S.	— .0877	+ 1.3	1.5	.....	74.7038	.....	.....
		S.	— .0817	— 4.7					
		S.	— .0897	+ 3.3					
		Mean.	— .0864						
T. B. M. 317.....	267.59	S.	— .6175	+ 2.9	1.9	.....	74.0892	.....	.....
		S.	— .6118	— 2.8					
		Mean.	— .6146						
T. B. M. 318.....	268.53	S.	+ .2876	+ 4.3	1.4	.....	74.3811	.....	.....
		S.	+ .2938	— 1.9					
		S.	+ .2944	— 2.5					
		Mean.	+ .2919						
P. B. M. 54.....	269.39	S.	— .0026	— 1.3	0.9	29.7	74.3772	+3.5	74.3807
		S.	— .0053	+ 1.4					
		Mean.	— .0039						

Results of precise leveling, Columbus to Memphis—Continued.

Bench.	Distance.	Direction.	Difference of elevation.	V.	r.	R.	Elevation.	Rod corr'n.	Corrected elevation.
	Km.		*M.*	*Mm.*	*Mm.*	*Mm.*	*M.*	*Mm.*	*M.*
T. B. M. 322	271.00	S.	— .6148	+ 1.3	0.9	.....	73.7637	.....	.....
		S.	— .6122	— 1.3					
		Mean.	— .6135						
T. B. M. 324	273.26	S.	+ .0574	+ 5.2	1.7	.....	73.8263	.....	.....
		S.	+ .0642	— 1.6					
		S.	+ .0662	— 3.6					
		Mean.	+ .0626						
P. B. M. 55	275.28	S.	— .2717	+ 1.5	1.0	29.7	73.5561	+3.6	73.5597
		S.	— .2686	— 1.6					
		Mean.	— .2702						
P. B. M. 56	280.68	S.	— .0572	+ 3.6	2.4	29.8	73.5025	+3.6	73.5061
		S.	— .0501	— 3.5					
		Mean.	— .0536						
T. B. M. 336	282.48	S.	— .6261	+ 3.3	2.2	.....	72.8797	.....	.....
		S.	— .6196	— 3.2					
		Mean.	— .6228						
T. B. M. 337	283.48	S.	— .6367	— 4.9	1.6	.....	72.2381	.....	.....
		S.	— .6449	+ 3.3					
		S.	— .6431	+ 1.5					
		Mean.	— .6416						
T. B. M. 338	284.34	S.	+ .4195	+ 3.7	2.5	.....	72.6613	.....	.....
		S.	(+ .5259)	Reject.					
		S.	+ .4269	— 3.7					
		Mean.	+ .4232						
T. B. M. 339	285.51	S.	— .3963	+ 4.4	1.7	.....	72.2964	.....	.....
		S.	— .3653	+ 0.4					
		S.	— .3602	— 4.7					
		Mean.	— .3649						
T. B. M. 342	287.69	S.	— 1.5285	+ 5.6	3.7	.....	70.7735	.....	.....
		S.	— 1.5173	— 5.6					
		Mean.	— 1.5229						
P. B. M. Memphis	290.49	S.	+15.8981	+ 4.7	3.2	30.5	86.6763	+2.0	86.6783
		S.	+15.9076	— 4.8					
		Mean.	+15.9028						

DESCRIPTION OF PERMANENT BENCH MARKS FROM COLUMBUS, KENTUCKY, TO MEMPHIS, TENNESSEE.

U. S. P. B. M. (7).—Small hole in copper bolt set horizontally in south side of brick building, half way between the most eastern windows of main building in first course of bricks below window sill. The building is situated on Front Street, Columbus, Ky. Is called the "Mansion House," and belongs to the Bank of Kentucky.

U. S. P. B. M. (8).—Center of hole in top of copper bolt in stone post in southeast corner of Baptist church yard, Columbus, Ky., 1.5 meters from each fence. Stone is marked "U. S."

U. S. P. B. M. (9).—Small hole in center of copper bolt set horizontally in last face of corner stone on northeast corner of same Baptist church.

U. S. P. B. M. (10).—Is top of copper bolt in top of stone post in ground set on "Chalk Bluffs," about 3 miles below Columbus, Ky. It is 35 meters north of old shed, 5 meters north of a cherry tree. It is between road and river, 150 meters back from river and 20 meters from road. At this point on the road a lane leads south between fields.

U. S. P. B. M. (11).—Is top of copper bolt in stone post in woods 200 meters back from river, 160 meters southeast of corner of corn-field, three-fourths miles above Worsham's Landing, Ky., and 7 miles below Columbus.

U. S. P. B. M. (12).—Is top of copper bolt in stone post in woods 30 meters above edge of heavy timber, 1¾ miles below Worsham's Landing, Ky.

U. S. P. B. M. (13).—Is top of copper bolt in stone post in northwest corner of P. J. Frenz's front yard, one-half meter from west fence. Bench is 2¾ miles above Hickman, Ky., and 400 meters below mouth of Little Obion River.

U. S. P. B. M. (14).—Is top of copper bolt in stone post in northwest corner of Episcopal church yard, Hickman, Ky., 1 meter from each fence.

U. S. P. B. M. (15).—Is center of square, cut on top of southeast corner of stone window sill in southwest corner of Millet's block, corner of Union and Clinton streets, Hickman, Ky. Vertical face of sill is marked "U. S. B. M."

U. S. P. B. M. (16).—Is top of copper bolt in stone post in northwest corner of Golder's front yard, 4⅓ miles below Hickman, Ky.

U. S. P. B. M. (17).—Is top of copper bolt in stone post in woods 9½ miles below Hickman, Ky. It is 80 meters from east bank of No. 8 chute and 20 meters from Cane Creek, on land of Henry Bochares.

U. S. P. B. M. (18).—Is top of copper bolt in stone post 62 meters from river, about 1 mile below foot of No. 8 chute, 72 meters southwest of dwelling house on land of Richard Finch. Approximately 13 miles below Hickman, Ky.

U. S. P. B. M. (19).—Is top of copper bolt in stone post 60 meters from river, 340 meters above Lester's house, 17 miles below Hickman, Ky., 1 meter north of fence and 1½ meter from Sycamore tree. This bench is 2 miles above Kentucky and Tennessee State line.

U. S. P. B. M. (20).—Is top of copper bolt in stone post 1,830 meters below Kentucky and Tennessee State line, 80 meters above △ "Kentuck" and on line between △ Kentuck and △ Lester and 100 meters from river.

U. S. P. B. M. (21).—Is top of copper bolt in stone post in woods 58 meters from river and 38 meters from road and 5¾ miles below Lester's Landing, Tenn.

U. S. P. B. M. (22).—Is top of copper bolt in stone post in southwest corner of Amberg's front yard in northern end of Tiptonville, Tenn.

U. S. P. B. M. (23).—Is top of copper bolt in stone post in north side of Nicholas Brady's yard, 1 meter from fence, Tiptonville, Tenn. (Brady's house is brick.)

U. S. P. B. M. (24).—Is top of copper bolt in stone post in woods 4 miles below Tiptonville, Tenn. It is 500 meters back from river at △ Riley which stands on river bank. Bench is 20 meters north of public road.

U. S. P. B. M. (25).—Is top of copper bolt in stone post in woods on land of Robert Watson, now occupied by J. B. George. It is 6¾ miles below Tiptonville, Tenn., and 1.6 miles above Basses' Landing. It is 150 meters west of house, 6 meters west of road.

U. S. P. B. M. (26).—Is top of copper bolt in stone post in woods on land of G. W. Curtis, 892 meters below Reelfoot or Donnahauer's Landing, Tenn. It is 80 meters from river and 100 meters north of Curtis's house.

U. S. P. B. M. (27).—Is top of copper bolt in stone post in woods at Mott's Landing, Tenn., on land of Terrell Fields, 4 miles above Booth's Point, Tenn., 140 meters back from river, 29 meters from an old shed. It is N. 37° E. 89 meters from Field's house, now occupied by John Hazaleno.

U. S. P. B. M. (28).—Is top of iron bolt in stone post in woods S. 60° E. 480 meters from Booth's Point Landing, Tenn. It is 55 meters east of fence and 4 meters from hickory tree.

U. S. P. B. M. (29).—Is top of copper bolt in stone post in corner of woods, 2 meters west of fence, 28 meters south of large cottonwood tree, 20 meters southeast of sycamore tree, and 16 meters east of box-elder tree, 226 meters from river, on land of W. M. Pate, and 4¼ miles below Booth's Point, Tenn.

U. S. P. B. M. (30).—Is top of copper bolt in stone post in woods 200 meters from river and 97 meters east of northeast corner of corn-field, 1 meter southeast of cottonwood tree, 8¾ miles below Booth's Point, Tenn., on land of Joseph Mitchell.

U. S. P. B. M. (31).—Is top of copper bolt in stone post 1 meter west of small sycamore tree, 18 meters east of public road, miles below Booth's Point, Tenn., 43 meters east of old chute, 93 meters west of fence on land of W. S. Henley.

U. S. P. B. M. (32).—Is top of copper bolt in stone post which marks △ "Obion" 1½ miles above Hale's Point, Tenn., 1,140 meters above mouth of Obion River, 10 meters west of public road. A high observing station is built over the point.

U. S. P. B. M. (33).—Is top of copper bolt in stone post in woods on land of ——— Thompson, esq., about 1¼ miles below Hale's Point, Tenn. It is 75 meters east of house now occupied by Daniel Cauglan, 60 meters south of road, 1 meter east of large elm tree about ¾ mile from river. It is 472 meters above bend in road between Hale's Point and Ripley.

U. S. P. B. M. (34).—Is top of copper bolt in stone post in woods 65 meters east of

river bank at "Wardloss Packet," 6 miles below Hale's Point, Tenn., 3 meters south of elm tree near canebrake on land of Merriweather's heirs.

U. S. P. B. M. (35).—Is top of copper bolt in stone post in woods 2 meters east of large cottonwood tree, 47 meters from river, 110 meters northeast of junction of Mississippi and Forked Deer rivers, 40 meters north of Forked Deer River, about ½ mile above head of Forked Deer Island (No. 26).

U. S. P. B. M. (36).—Is top of copper bolt in stone post in woods on east side of chute of Island 26, 90 meters from chute, 4 miles above Ashport, Tenn.

U. S. P. B. M. (37).—Is stone in ground in woods 85 meters back from river, 200 meters above Ashport, Tenn., 1 meter north of sycamore tree on land of J. S. Kelly.

U. S. P. B. M. (38).—Is top of copper bolt in stone post in ground in woods 90 meters from river, 1 meter east of large red oak, 4¼ miles below Ashport, Tenn.

U. S. P. B. M. (39)—Is top of copper bolt in stone post back of cotton field, 1 meter west of sycamore tree, 24 meters west of fence, 329 meters back from △ "Plum Point" on river, 1 mile above Plum Point, Tenn., on land of E. B. Friend.

U. S. P. B. M. (40).—Is top of copper bolt in stone post in woods 45 meters back from river and 2½ miles below Plum Point, Tenn., 1 meter east of sycamore tree and 1 meter west of box-elder tree.

U. S. P. B. M. (41).—Is top of copper bolt in stone post at base of bluffs above Fort Pillow Landing, Tenn., at mouth of Cold Creek. It is 30 meters from river and 80 meters below Horace Dike's house.

U. S. P. B. M. (42).—Is top of copper bolt in stone post in woods on land of A. Lea & Co., about ¾ mile west of post-office at Fulton, Tenn., 125 meters back from river, and about 140 meters east of a graveyard in the woods. It is 12 meters east of fence, and 300 meters west of Dr. Allen's house.

U. S. P. B. M. (43).—Is top of copper bolt in stone post in woods 50 meters from river and about 20 meters from base of bluffs. It is 2 meters from an elm tree. It is 1,648 meters below the flouring-mill at Fulton, Tenn.

U. S. P. B. M. (44).—Is top of copper bolt in stone post in woods 110 meters back from river and 588 meters above the mouth of South Hatchee River, Tenn.

U. S. P. B. M. (45).—Is top of copper bolt in stone post on Hatchee Island, 2 miles above Randolph, Tenn., on land of Lena Alston, 40 meters northwest of house, 45 meters west of Hatchee Island Chute.

U. S. P. B. M. (46).—Is top of copper bolt in stone post on high knoll in west end of Randolph, Tenn., between Memphis road and river, 44 meters from Mrs. Deakin's house, 32 meters south of stable. A △ stands between this bench and the river.

U. S. P. B. M. (47).—Is top of copper bolt in stone post in woods 21 meters north of Randolph and Memphis road at point where road crosses an old fortification line, 2 meters from a large cottonwood tree. It is 1,200 meters below Randolph post-office, measured along Memphis road.

U. S. P. B. M. (48).—Is top of copper bolt in stone post on east bank of levee, about 700 meters below Richardson's Landing, Tenn., 85 meters back from river, 80 meters south of △ "Richardson's," 6 miles below Randolph, Tenn. This bench was established by a former party of this survey.

U. S. P. B. M. (49).—Is top of copper bolt in stone post in woods on land of ——— Etherly, 4 miles below Richardson's Landing, Tenn., 150 meters from bank of chute of Island 35, 150 meters south of southeast corner of field.

U. S. P. B. M. (50).—Is top of copper bolt in stone post back of Payne's Landing, Tenn. It is 242 meters east of △ "Wallace," and 257 meters from river, 17 meters north of end of lane, 2 meters west of fence, and 12 miles below Randolph, Tenn. This bench was established by a former party of this survey.

U. S. P. B. M. (51).—Is top of copper bolt in stone post 160 meters from the river, 140 meters south by southeast of a △ and 1 meter from small sycamore tree on land of L. Zeigler. It is 750 meters below upper end of "old" river at Centennial Cut-off, Tipton County, Tennessee, 4 miles above Thomas Landing, Tenn.

U. S. P. B. M. (52).—Is top of copper bolt in stone post on land of J. R. Walt, 160 meters from river, 480 meters above Thomas Landing, Tenn. It is 1 meter west of box-elder tree, 1½ meters east of mulberry tree.

U. S. P. B. M. (53).—Is top of copper bolt in stone post in canebrake 102 meters from river (old bed), and about 2 miles below Centennial Cut-off, 52 meters south of road leading east from river, 1¼ miles below mouth of Bateman's Bayou, Tenn., 1¾ miles above Brinkley's Landing, Tenn., on land of John Turner's heirs.

U. S. P. B. M. (54).—Is top of copper bolt in stone post in woods on land of ——— Duncan, about 130 meters from chute of Island 40. It is 2,732 meters below head of chute, 95 miles east of road.

U. S. P. B. M. (55).—Is top of copper bolt in stone post in edge of woods east of field, 130 meters east of river, about ¼ mile below foot of Island No. 40, and northeast of cabin, which is 14 meters from river.

U. S. P. B. M. (56).—Is top of copper bolt in stone post in woods on land of ——— Claybrook and Williams. It is 10 meters east of slough, 40 meters west of Memphis

road, 446 meters south of Costin's house, and 267 meters south of a cabin in field. By the public road this bench is just 6 miles above the new custom-house at Memphis, Tenn.

U. S. P. B. M. "Memphis."—Is center of hole in head of copper bolt leaded horizontally in face of subsill of first basement window from southwest corner on west side of new custom-house, Memphis, Tenn. It is marked $\frac{\text{U. S.}}{\text{B. M.}}$ This bench was established in 1878.

APPENDIX D.

REPORT OF ASSISTANT ENGINEER W. H. POWLESS UPON OBSERVATIONS AT PLUM POINT, NOVEMBER, 1879, TO NOVEMBER, 1880.

OFFICE OF MISSISSIPPI RIVER COMMISSION,
Saint Louis, March 23, 1881.

LIEUTENANT: I have the honor to submit the following report upon the cause of the changes which have been found to occur in the bed of the Fulton section.

The nature of these changes is shown in Fig. 6, Pl. 1, in which the mean datum area curve of cross-sections Nos. 2, 3, 4, 5 and 6 of the Fulton section is shown in connection with the gauge curve. It will be seen that this mean datum area varies inversely with the gauge heights, indicating that a fill over the river-bed occurs on a rising stage and a scour on a falling stage. The average variation in the level of the river-bed between high and low water was 6.5 feet.

The study of the rise and fall of the bottom in this locality requires a knowledge of the changes which occurred in that portion of the river immediately above it. These changes have been investigated as far as the foot of Osceola Bar, and have been represented graphically in the tracing.

For a rising stage, a comparison has been made between the low-water survey of November, 1879, and the first Craighead—third Bullerton—fifth Fulton survey of December, 1879–January, 1880. For a falling stage the comparison has been between the third Craighead—sixth Bullerton—ninth Fulton survey of March, 1880, and the fourth Craighead—seventh Bullerton—tenth Fulton survey of April, 1880. The stage of the river at the date of these various surveys, and its fluctuations between them, are shown in Fig. 6.

The mean velocity, area, surface, width, and mean depth of the various cross-sections at the low-water stage of November, 1879, and at a stage 26.6 feet higher (January 3, 1880), are shown in Figs. 1 and 2, Pl. VII, respectively. The distance between the cross-section lines have been measured along the axis of the stream at the stage of January 3. The areas of the cross-sections have been measured with a planimeter and corrections applied to reduce them to the stages of November 13 and January 3.

The discharge for January 3, 954,455 cubic feet per second, was observed at Fulton; that for November 13, 79,000 cubic feet per second, was computed from the equation of the parabola, which expresses very closely the relation between discharge and gauge height.

In Fig. 7, Pl. I, there is represented a cross-section at the Fort Pillow eddy, at the stage of January 3, in which the eddy portion is represented by the shaded area. In the absence of measurements the mean velocity of the eddy current has been assumed as 2 feet per second. The down-stream discharge through the cross-section has been taken equal to the observed discharge at Fulton, increased by the eddy discharge. The mean velocity has been taken equal to the quotient of the down-stream discharge by the unshaded area. For the low-water survey, the mean velocity of the eddy was assumed to be 0.5 foot per second, and its surface width was much reduced. In the curves, Pl. VII, the dimensions of the down-stream portion of the eddy section are only represented.

The mean velocity of 10.1 feet per second, computed for the eddy section, for January 3, is probably too small, as, owing to the swift current and the whorls and boils, the soundings could not be taken with great accuracy. The effect of an error of this nature would be to show too great an area and mean depth, and too small a mean velocity.

In Fig. 2 the areas, &c., given for the cross-sections above the foot of Osceola Bar are those of the main river portion only, there being no current in Osceola Chute at the time of the survey.

It may be mentioned here that the low-water of November, 1879, was, at Memphis, 2 feet above the lowest water ever observed (December, 1872).

Figs. 3 and 4, Pl. VII, show the changes that have occurred over the reach between the surveys previously mentioned. The area above the line AB represents the volume in cubic feet of the excess of scour over fill, and that below it the excess of fill over scour. At any cross-section the ordinate to the curve bounding these areas denotes

the area in square feet of the difference between the scours and fills. In a similar manner, the ordinate at any cross-section, to the curve bounding the area inclosed by a full line, represents the area of caving in square feet, but the area inclosed between this curve and the line AB does not represent the volume of caving only in a straight reach.

In computing the volume of caving, it has been assumed that the rate of caving from November 13 to December 1, during which interval no measurements were taken, was equal to that observed from December 1 to January 3. Due allowance has been made for the various ways in which the caving has affected the profile of the banks as noted in a report previously submitted.

In making the comparison of the cross-sections of the low-water survey with those of the December–January survey, the profiles of the low-water cross-sections were made complete by the addition of the bar profiles made in 1879, under direction of Major Suter. At the time these bar profiles were obtained the river was about 9 feet above low-water, and until low-water did not sensibly exceed that height.

In Fig. 3, Pl. VII, the changes occurring on cross-sections 1 to 6, both inclusive, of the Craighead section have not been represented, as their locatian was changed in the interval between the surveys. In Fig. 4 the changes in the vicinity of the Fort Pillow Eddy could not be represented, as the cross-sections in that locality were not sounded at high-water.

An inspection of Fig. 1 shows that at low-water the river has a free discharge through the eddy section and enters the Fulton section with but a slight diminution of mean velocity; also that the mean velocity of the river at the Bullerton section is somewhat greater than that at Plum Point. Owing to the great variations in surface width these conditions are soon changed when the river rises. The water then tends to gorge at the eddy; the variation in velocity between the river at that locality and the Fulton section becomes more marked, and a decrease in velocity takes place between Plum Point and the Bullerton section.

As during the greater portion of the interval between November 13 and January 3 the curve of mean velocity will bear a general resemblance to that shown for January 3, the changes shown in Fig. 3 can be properly studied in connection with it.

The decrease in the mean velocity of the water entering the Bullerton section is accompanied by a heavy deposit on the river-bed, extending to the foot of Bullerton Towhead. Below this locality the increase in mean velocity is attended by a marked scour. This scour, which occurs mainly in the channel, is, with two exceptions, continuous to the foot of the eddy. These exceptions are at cross-section No. 19, where a fill occurred, probably due to the caving bank above, and at No. 14, where a scour actually occurred in the channel, but was exceeded by a fill along Yankee Bar.

It will be noticed that the volume of scour suffers no decrease at cross-sections No. 20, 21, and 22, where a very marked diminution of mean velocity has occurred.

This is due to the fact that in the Fort Pillow Bend the swiftest current is not found along the concave shore, but approximately within the dotted lines shown in Fig. 7, Pl. I and that between this position of maximum velocity and the concave bank, a large volume of very slack water is found. The velocity of this slackwater being much less than the mean velocity, causes a corresponding difference between the mean and maximum velocities.

The velocity in the channel where the bulk of the scouring occurs thus undergoes no marked decrease corresponding to that shown in the mean velocity curve.

It thus appears that on a rising stage the water passing through the eddy cross-section carries with it a very large quantity of material derived from erosions immediately above. The bulk of this material has been scoured out in localities where the velocity of the current was much *less* than that on the Fulton section, and this portion has doubtless been carried through the Fulton section, and has played its part in the shoaling of Chute No. 34, and in the formation of the large bar in front of Randolph.

But between the vicinity of cross-section No. 24 and the foot of the eddy the velocity within the dotted lines of Fig. 7, Pl. I, is much in excess of the maximum velocity found on the Fulton section. A large volume of material (see Fig. 5, Pl. VII) has been carried away from the bed by this excessive velocity, and it seems probable that on experiencing the sudden decrease in velocity a portion is dropped, causing the fill over the Fulton section.

Beside the material derived from the bottom in the vicinity of the eddy, a quantity, small in comparison, but of a much greater specific gravity, must have been obtained from the bluff, which at high stages is slowly eroded. This is probably the source of the bluff gravel found in the dredgings taken in the deposit on the Fulton section.

The average percentage composition of these dredgings, as well as those taken in the deposit on the Bullerton section, is as follows:

	Fulton.	Bullerton.
Coarse gravel, over .75 inch in diameter	3	0.3
Medium gravel, .25 to .75 inch in diameter	6	3
Fine gravel, .1 to .25 inch in diameter	4	3.5
Coarse sand, .01 to .1 inch in diameter	75	58.2
Fine sand, below .01 inch in diameter	11	34.3
Lignite	1	0.7
	100	100

This comparison shows that the Fulton deposit is the heavier, as would be expected if it was derived from the vicinity of the bluff. One specimen of gravel found in it measured 2.5 by 1.5 inches.

Before discussing Fig. 4, Pl. VII, it should be mentioned that during the interval between the third and fourth Craighead surveys, the river was nearly stationary at a very high stage for a considerable period before the fall commenced. This would modify somewhat the results for that section; it is believed, however, that the general action over the reach of the falling river is represented by the diagram.

As stated above, the changes in the vicinity of the eddy cannot be shown. It seems probable, however, that as the river was nearly at high-water for a month before the fall commenced, the excessive velocity must have swept from the bottom the material previously deposited there; also, that no fill would occur till a considerable fall in the river had greatly reduced this velocity. From an inspection of the deep boring* made at Fort Pillow, in 1879, the bed proper of the river in this locality would seem to be in an immense layer of brown clay mixed with lignite. When the material deposited at the low stage has been swept away the erosion must then practically cease.

The main feature shown in Fig. 4, relative to the subject under discussion, is that the fills over the reach are much in excess of the scours, and that consequently the water passing through the eddy cross-section is not burdened with material derived from erosions above. The material carried by the river rounds the Fort Pillow Bend with a velocity *less* than that of the Fulton section; experiences an acceleration as it approaches the eddy; passes the eddy without any increase in volume by erosion, except from the wearing away of the bluffs; and then suffers a retardation as it enters the Fulton section. If the increase in velocity at the eddy does cause a marked addition to this material by erosion, a fill on the Fulton section, similar to that which continues on the Bullerton, long after the river has fallen from high-water would be expected. If, however, for the reasons given, no further erosion can occur, the circumstances would be the same as though the water passed directly from the velocity in the Fort Pillow Bend to the greater velocity in the Fulton section, and, as is the case, a scour would result. The surveys made on the Fulton section at the beginning and end of the high-water stand of March show that a fill occurred during the interval. This fact would tend to show that the erosion in the vicinity of the eddy ceased before the decline in the river from high-water commenced.

The following is a summary of my conclusions in regard to the action of the river at Fulton:

At the low stage a deposit takes place in the vicinity of the eddy. As the river rises to high-water, the high velocity puts this deposit in motion, and the retardation which it experiences as it leaves the eddy causes it to be deposited on the Fulton section. Before the decline from high-water begins, the river at the eddy has scoured to the clay layer, and further erosion ceases.

As the river falls, the water entering the Fulton section still experiences a retardation, but as the higher velocity has created no scour there is no tendency toward a fill. On the contrary, owing to absence of this erosion, the effect is the same as though the water passed at once from the velocity above the eddy to the greater velocity of the Fulton section, and an erosion of the material deposited during the rise occurs. This lowering of the bed continues till a rise changes the action of the river in the reach above.

The action of the river at the Bullerton section, where a fill not only occurs on the rise from low to high water, but also on the fall from high-water to a stage about 15 feet above low-water, is due to the fact that the velocity there is much less than any that occurs for a long distance above. The material derived from erosions and caving banks above is consequently precipitated on experiencing this retardation. When the river falls to a stage about 20 feet above low-water, the bottom becomes so elevated by the deposits that if it remained unchanged till low-water, the river would

* See Fig. 9, Pl. I.

practically have no cross-section. (See Fig. 8, Pl. VII.) The river as it approaches the low-water stage is thus obliged to scour out a channel for itself.

The action of the falling river on that portion of the Craighead section between the head of Yankee Bar and Fort Pillow, is nearly the reverse of that during the rising stage; that is, the tendency is to restore the cross-sections to their dimensions before the rise. Had the fall of the river between the surveys of Fig. 4, Pl. VII, been equal to the rise between those of Fig. 3, this change of action would probably have been general. As it is, this reversal has taken place in twelve out of the sixteen cross-sections between Nos. 8 and 25. The four sections, when this fails, all show a continuation of the erosion of the rising stage. On two, Nos. 12 and 13, the locality of this erosion has remained unchanged; on the remainder, Nos. 10 and 23, the locality has been shifted from the channel to the outside of Yankee Bar in the former, and over Craighead Bar in the latter. On Nos. 18 to 24, both inclusive, very little fill has occurred within the limits of the dotted lines in Fig. 7, Pl. I.

In the curves of mean slope the fall of the surface between the gauges has been directly observed; the distribution of the slope, however, between the gauges, has been made by using Weisbach's formula, involving friction and variations in sectional area. This subject will be treated in a future report.

It may be noted that there is a resemblance between the curves of surface width and mean depth similar to that existing between those of area and mean velocity.

The following table gives the variations in area, &c., over the reach for low-water and for a stage 6 feet below high-water:

	Low-water.	26.6 feet above low-water.
Maximum area.....square feet..	68,500	260,000
Minimum area.....do....	30,220	94,500*
Maximum mean velocity.....feet per second..	2.65	10.1*
Minimum mean velocity.....do....	1.15	3.67
Maximum mean depth.....feet..	43.6*	60.7
Minimum mean depth.....do....	6.0	23.9
Maximum surface width.....do....	7,333	8,840
Minimum surface width.....do....	1,375	1,680*
Fall per mile through Bullerton Chute.....do....	1.15	0.26

*Eddy cross-section. Dimensions are for down-stream portion only.

Approximate values of the changes shown in Figs. 3 and 4, and also of the volume of sediment carried by in suspension, will next be given. The ratio by weight of sediment to water is a mean value derived from the very few sediment observations taken in the interval between the surveys. The specific gravity of the material in suspension has been assumed to be 1.9.

1. November 13 to January 3:

	Cubic feet.
Fill above foot of Bullerton Tow-head	180,000,000
Fill between foot of Bullerton Tow-head and eddy	20,000,000
Fill over Fulton section	40,000,000
Scour over reach	350,000,000
Caving banks—above foot of Bullerton Tow-head	14,000,000
Caving banks—below foot of Bullerton Tow-head	19,000,000
Scour, derived from reach, entering Fulton section	349,000,000
Scour, derived from reach, passing through Fulton section	309,000,000
(A) sediment in suspension passing through Fulton section	1,011,000,000
(B) sediment in suspension passing foot of Tow-head	702,000,000

Ratio of (B) to (A), 1:1.44.
Ratio by weight of sediment to water, 1:1,000.

2. March 6 to April 11:

Fill above No. 5, Craighead section	50,000,000
Fill below No. 5, Craighead section	100,000,000
Scour above eddy	35,000,000
Scour over Fulton section	18,000,000
Caving banks over reach	22,000,000
Scour, derived from reach, passing Fulton section	
(A) sediment in suspension passing Fulton section	832,000,000
(B) sediment in suspension passing Bullerton section	907,000,000

Ratio of A to B, 1:1.09.
Ratio by weight of sediment to water, 1:2,000.

This data shows that on the rising stage the local action on the reach has a very marked effect upon the amount of sediment in suspension; also that the material derived from caving banks is much less than that obtained from erosions of the bed.

The quantity of material forced through the Fulton section in the form of sand-waves or reefs is small in comparison with that carried in suspension. Let it be assumed that the entire reef above the plane of the foot of the crests has motion, and, taking an extreme case, that the crest is 12 feet in height and extends from bank to bank, perpendicular to the current. The mean cross-section will then be 15,000 square feet, and multiplying this by the maximum rate of motion observed, 35 feet per day, and by the number of days between November 13 and January 3, we have for the volume passed in that interval, 26,250,000 cubic feet, or about 2.5 per cent. of the volume passed in suspension. It may be possible, however, that the lighter portion of the material in motion is not deposited in the hollow of the crests, but is swept over them. An action of this nature would modify materially the result of the above calculation.

The area carried away by the caving of the banks on the reach for the ten months ending October 1, 1880, was 72.6 acres. The mean depth of caving was 38 feet.

Very respectfully, your obedient servant,

W. H. POWLESS,
Assistant Engineer.

SMITH S. LEACH,
First Lieutenant of Engineers,
Secretary of Mississippi River Commission.

OFFICE OF MISSISSIPPI RIVER COMMISSION,
Saint Louis, March 23, 1881.

LIEUTENANT: I have the honor to submit the following special report upon the motion of the river-bed on the Bullerton section:

The bottom of the river at this locality is broken up by a series of reefs, which have a gentle slope on the up-stream side and a very steep slope on the down-stream side. The material composing the up-stream surface being kept in motion by the current, falls over the summit of the reef, causing a gradual down-stream movement. This movement, together with examples of the form of the reefs, is shown in Plate VIII.

The manner of obtaining the longitudinal profiles, as well as those of the cross sections taken in connection with them, has been described in a report previously submitted. The average distance apart of the longitudinal soundings varied from 6 to 9 feet, according to the stage of the river.

In Fig. 3, which shows the position of the longitudinal lines, planes have been drawn to coincide with the general direction of each group. The projection of the reef-crests upon these planes is shown in Fig. 1. The effect of this projection is to distort somewhat the distances between the crests on the various surveys. In cases where a profile deviated any considerable distance from its plane, its projection has been omitted. The rate of motion of the reef-crests has been obtained from Fig. 2.

The positions of the reef-crests, shown in Fig. 2, have been obtained by joining the points on the cross-section and longitudinal lines where crests existed, as shown in Fig. A, Plate 10.

The general direction of the reef-crests was known from an observation of their ripple or break. That of the crest extending from the bar off the Tennessee shore towards Osceola, was distinguishable at times the entire width of the river. From the presence of these ripples it is known that these reefs extend up-stream for at least a half mile above the foot of Osceola Bar.

The direction of the surface current during the various surveys is shown by the longitudinal lines in Fig. 3. A comparison of Figs 2 and 3 shows that near the left bank the crests make quite an acute angle with the direction of the current, but that this angle gradually increases toward the right bank, till at the locality where the current sets into Bullerton Chute, it becomes 90°.

Figs. 1 and 2 show that the crests are subject to great variations, becoming obliterated in places and scouring back in others. In some instances small reefs appear on the up-stream slope of a main one.

Fig. 4 shows several longitudinal profiles of the bottom. The best profile obtained, that of April 26, shows a tendency of the reefs to travel in groups of two or three.

The best examples of the gradual down-stream movements of the crests between the surveys are seen in *a b*, *c d*, and *e f*, Fig. 2. The reef-crest nearest the left bank forms for a distance the edge of a bar whose growth is represented by its motion.

The rate of motion, distance, and heights of crests are quite variable.

For the profile of April 26, shown in Fig. 4, the height and distance apart of the crests are as follows:

	Feet.
Average distance, parallel to current	620
Maximum distance, parallel to current	955
Minimum distance, parallel to current	350
Averance distance, perpendicular to crests	515
Average height of crests	6
Maximum height of crests	8.5
Minimum height of crests	5

For the well-defined crest *a b*, Fig. 2, the height and daily motion are as follows:

Average motion, perpendicular to crest	14
Maximum motion, perpendicular to crest	18
Minimum motion, perpendicular to crest	6
Average motion, parallel to current	18
Average motion, parallel to cross-section	19
Average height of crest	4

Rate of motion, perpendicular to crests, between surveys of—

May 14—May 22.	River fell 8.4 feet	7.2
May 22—May 29.	River fell 1 feet	10.4
May 29—June 7.	River rose 3.5 feet	18.9
June 10—June 18.	River fell 2.4 feet	6.5
June 22—July 10.	River rose 10 feet	19.5

In this instance the rate of motion is much greater on a rising than on a falling stage.

The maximum height of crests for any given stage is found in the locality of the swiftest current. For varying stages, the maximum heights are found when the river has been at a high stage for a considerable period. This is shown in the survey of April 26, when the average height of crests was 6.1 feet. The height of crests seems to be affected not only by the stage of the river, but also by the rapidity of a rise or fall.

On April 26 the average height was 6.1 feet; on the sudden decline in May, the heights decreased quite uniformly, reaching 3.2 feet at the stationary river on May 29. Then for the gradual rise of 3.5 feet, it increased to 3.8 feet, remained the same for the slight fall of 2.4 feet to June 19, and then increased to 4.4 feet, as the river rose 10 feet to July 9. The effect of a very rapid rise on the height of the crests is to decrease it and also to diminish their distance apart. This is shown in the longitudinal survey of December 15, when the river had risen suddenly 18 feet, and of February 17, when a rapid rise of 14 feet had occurred. In each case the reefs were found to have been so flattened that they were scarcely distinguishable from the accidental irregularities of the bottom.

The distance between the crests is subject to very great irregularities. Generally it seems to vary with their height. For the large crests of April 26, this distance in some cases exceeded 1,000 feet. When the crests become much reduced in height, the distance between them becomes small and the reefs are transformed into a series of waves. (See Fig. 6.)

A summary of the results obtained is as follows:

	Feet.
Average height of crests, about	4.0
Extreme height of crests, about	13.0
Average daily motion, perpendicular to crests, about	13.0
Extreme daily motion, perpendicular to crests, about	20.0
Average distance between crests, about	300

The depth of water in which the observations were made varied from 10 to 30 feet.

When the bar on the left bank became bare, on the decline after the June-July rise, its surface was noticed to be covered with miniature reefs which bore a general resemblance to those in the river. Their crests, however, were at right angles to the direction of the current over the bar. Their height was only a few inches, and their distance apart varied from 5 to 15 feet.

The reefs in the Bullerton section become almost obliterated in that portion of the river between the foot of Osceola Chute and the head of Bullerton Chute. This is probably due to the presence of Osceola Bar. From several longitudinal surveys made, it is known that a similar disappearance takes place between the medium and high stage, below the foot of the Bullerton section.

The effect of these reefs crossing the cross-section obliquely is to cause the profiles of the latter to be quite irregular, a circumstance which was of great assistance in tracing the direction of the crests. The effect of the reef motion upon the cross-sections profiles is to show an alternate scour and fill, as shown in Fig. B, Plate 10. (See also Fig. 5, Plate 8.)

In finding the action of the river between surveys, by means of the difference between datum areas, it is thought that these alternate apparent scours and fills due to reef movement would practically compensate each other and not affect the results already obtained.

Numerous surveys were made at the low-water stage of 1880, but as the notes have not yet been platted, no investigation of the dimensions, &c., of the reefs at that stage could be made. An inspection of the notes shows that at that time reefs with crests of 5 feet existed in the locality of the swiftest current.

Very respectfully, your obedient servant,

W. H. POWLESS,
Assistant Engineer.

SMITH S. LEACH,
First Lieutenant of Engineers,
Secretary of Mississippi River Commission.

OFFICE OF MISSISSIPPI RIVER COMMISSION,
Saint Louis, March 28, 1881.

LIEUTENANT: I have the honor to submit the following special report upon the motion of the river-bed on the Fulton section.

In this locality the reefs occupy only about two-fifths of the width of the river, their crests extending from the center towards the right bank. The circumstances of their motion and their longitudinal profiles are essentially the same as those described in the report upon the Bullerton section. Their crests, however, are less abrupt and their disappearance at low-water more complete.

The direction of the reef crests could not be determined, as, owing to the depth of water, no ripple was occasioned by them. As the profiles of the cross-sections are quite smooth, presenting very few of the marked irregularities found on the Bullerton section, it is inferred that the crests are parallel to them, and, consequently, at right angles to the current, or else intersect them at a very acute angle.

In a few instances a ridge in the cross-section profile between longitudinal lines, which each have a crest just above it, indicated that the outline of the reef was curved, as shown in the Fig. C, Plate 10.

During the prevalence of upstream winds, a marked ripple was noted opposite the village of Fulton, and longitudinal soundings taken through it showed a crest of 5 feet in 25 to 30 feet of water. The direction of this crest was nearly perpendicular to the current.

The following are examples of the heights of crests and their distance apart on the various surveys:

Date.	Height above low-water.	Action of river.	Average height.	Average distance apart.
	Feet.		*Feet.*	*Feet.*
December 26	18.0	Rising rapidly	8.0	770
February 17	22.5	....do	3.0	100
April 22	22.8	Rising slowly	6.8	1,050
May 5—8	26.5	....do	8.0	1,000
May 12	25	Falling slowly	(*)	(*)
May 25	13.5	Falling rapidly	(†)	(†)
June 8	16.0	Stationary	(†)	(†)
June 19	13	....do	3.8	140
July 13	24	....do	3.8	800

*Crests not very marked. †Crests obliterated.

The height of the crests does not vary with the gauge readings; it is probably much influenced by the rapidity of a rise or fall, or the duration of a stand. On the sudden rise of 18 feet from low water to December 26, the crests attained their maximum height, while on the falling stage in May they disappeared at a stage about 20 feet above low-water, and were not encountered again till on the stand preceding the June–July rise. This rise did not change the height of the crests, but greatly increased the distance between them.

The distance apart of the crests is quite variable. It seems, however, to be a function of their height, as its maximum value is found when the crest height is a maximum, and *vice versa*.

The rate of travel of the reefs varies quite uniformly with the stage of the river and is a function of the velocity. The following examples are given:

Survey.	Gauge.	Action of river.	Average daily rate of travel.
	Feet.		*Feet.*
July 7—13	22 to 24	Rising	30
July 3—7	18 to 22	....do	22
June 11—15	16 to 15	Falling	24
June 15—19	15 to 13	....do	22
June 23—July 3	13 to 18	Rising	18
June 19—June 23	13 to 12	Falling	16

In the surveys made at a stage about 5 feet above low-water the longitudinal profiles were remarkably smooth, showing a complete obliteration of the reefs.

Owing to the direction of the crests being unknown, the effect of their motion upon the profiles of the cross-sections cannot be graphically represented as in the case of the Bullerton section. For a distance of 1,000 feet to the right of the center of the stream the changes occurring in the river-bed at those stages at which the reefs exiet are due partly to the action of the river and partly to the passage of the reefs. The scours and fills obtained on the discharge section by taking the difference of datum areas would be modified by this consideration. It is believed, however, that the effect of the reef motion is practically eliminated when a mean datum area for several consecutive cross-sections is taken, as was done in investigating the changes on the Fulton section. In this case, in which six cross-sections were taken, the distance between the extreme ones was 2,000 feet. In this space several crests of varying distances apart would be found, and it is probable that the apparent scours and fills on the cross-sections, due to reef motion, would neutralize each other.

In Fig. 1, Plate 9, the motion of the reef crests is represented in the manner explained in the report on the Bullerton section.

Fig. 2 represents the longitudinal profile of April 22, taken in the line of maximum velocity.

A summary of the results obtained on the Fulton section is given below. For convenience of comparison the results obtained on the Bullerton section have been added:

	Fulton.	Bullerton.
	Feet.	*Feet.*
Average heights of crests, about	4.7	4.4
Extreme heights of crests, about	12.0	13.0
Average daily motion, perpendicular to crest, about	22.0	13.0
Extreme daily motion, perpendicular to crest, about	35.0	20.0
Average distance apart of crests, about	600	300
Depth of water in which results were obtained	45 to 60	10 to 30
Stage of river above low-water	12 to 26	12 to 26
Average mean velocity of river, feet per second	5.8	3.5

Very respectfully, your obedient servant,

W. H. POWLESS,
Assistant Engineer.

SMITH S. LEACH,
First Lieutenant of Engineers,
Secretary of Mississippi River Commission.

OFFICE OF MISSISSIPPI RIVER COMMISSION,
Saint Louis, July 11, 1881.

LIEUTENANT: I have the honor to submit the following report upon the surveys and observations made under the direction of the Mississippi River Commission on the Plum Point Reach during the year ending October 20, 1880.

The principal features of my instructions, embraced in your letters of October 16 and 21, were as follows:

To make during the low-water of 1879 a hydrographical survey of the river from Ashport to Fulton.

To determine, as far as possible, the form, dimensions, material, and rate of motion of the sand waves.

To sound, as far as possible, for every change of five feet on the gauge, nine cross-sections in the wide river off Driver's Landing designated as the Bullerton section, eight cross-sections in the narrow river above Fulton, designated as the Fulton section, and monthly twenty-seven cross-sections comprised between the Bullerton and Fulton sections and designated as the Craighead section. (See Plate I.)

To take observations on alternate days for ascertaining the discharge and the amount of sediment carried in suspension.

To ascertain weekly the slope of the river in the vicinity of the gauging station.

To run weekly a set of floats in a vertical plane.

To run when possible sets of rods at Fulton, Craighead Point, and Yankee Bar, at low, medium, and high stages, in order to obtain the transverse velocity curve for a surface stratum of six feet in depth.

To determine the amount and rate of caving on the reach.

The party left Saint Louis on October 20, 1879, and arrived at Fulton five days later. A site for a camp was secured about 700 feet above the Fulton steamboat landing, and the work of erecting the tents was immediately commenced. The steam launch Thetis arrived on the 25th instant, and was at once put in order for winter service. On the 28th instant a gauge was erected at camp and tri-daily readings commenced.

The river being nearly at low-water mark, the survey from Ashport to Fulton was commenced at once. and in order to complete it before a rise occurred, the entire available force was engaged upon it. This survey was begun on November 4, and finished on November 14, on which date the river reached a low-water stand. With few exceptions the signals and triangulation tripods established by the party previously located on the reach were found intact, a circumstance which greatly abridged the work. Nearly all the cross-sections sounded were identical with those established by this party.

On the completion of this survey the force was subdivided, a portion being formed into a gauging party, under the immediate charge of Chief Assistant G. S. Davison, and the remainder into a sounding party, under the immediate charge of Recorder C. F. Potter.

The first work of the sounding party was to repair the signals and triangulation tripods remaining on the reach, to erect and locate the necessary new ones, and to clear the undergrowth on the various section lines. The cross-section surveys were then commenced. The length of river covered by these surveys was 11.5 miles, the length of the Bullerton and Fulton sections being each 1.25 miles and that of the Craighead section 9 miles. Of the 44 cross-sections, 35 were identical with those sounded by the survey and observation party previously located on the reach. During high water these surveys were made with difficulty, owing to the great amount of drift encountered and owing to the inability of the launch to stem the current in the narrow river between Fort Pillow and Fulton. The winter being unusually mild, no delay whatever was caused by floating ice or by cold weather.

Several longitudinal surveys were made during the winter off Bullerton Towhead and on the Fulton section. Attempts to take longitudinal soundings, commencing at a fixed point and extending along a fixed line, failed, owing to the buoys being carried away by the drift.

Soon after the commencement of field work, gauges were erected at Driver's and Tanza's Landings, which were read whenever surveys were being made in their vicinity. Owing to the caving bank no gauge could be erected on Craighead Point; several observations were made, however, by leveling to the water surface.

Sixty-three dredgings were taken during the year—forty-three upon the Bullerton section, and the remainder upon the Fulton section.

Numerous measurements to ascertain the rate of caving on the reach were made.

On May 6, in accordance with your instructions, all the cross-sections on the reach, except Nos. 3, 4, 5, and 6 of the Bullerton section and the same numbers of the Fulton section, were discontinued. The ground included between the upper and lower cross-sections at each locality was covered by longitudinal soundings, there being ten lines in the width of the river. At each section the longitudinal lines were sounded immediately after the cross-section lines, the whole constituting one survey. These surveys were made alternately at the two localities and were repeated as often as possi-

ble until the close of field work. In order to give, in connection with the soundings, complete profiles between the banks, levels were run before and after the July rise on cross-sections Nos. 3, 4, 5, and 6 of the Bullerton section across the bar formed off the left bank.

The gauging party, after clearing the undergrowth and erecting the signals, observing houses, and telegraph lines, commenced taking discharge observations on November 29, cross-section No. 4 of the Fulton section having been selected for that purpose. The sediment observations were commenced on November 28. They were discontinued from December 4 to January 1, owing to the loss of the apparatus, and from February 26 to March 30, owing to the non-arrival of the necessary supply of bottles. Until May 6 the discharge and sediment observations were taken as far as practicable on alternate days; after that date they were taken daily, Sundays excepted.

The vertical velocity, transverse velocity, and slope observations were taken, as far as possible, at the times designated in your instructions.

During October, in accordance with your orders, two permanent gauges were erected on the right bank—one a short distance above the head of Chute No. 34, and the other opposite the foot of the Fort Pillow eddy. Mr. I. H. Lanier, who served as steersman on the Thetis during the year, was appointed gauge-recorder.

The oscillations of the river during the year are shown in Plate III, Fig. 3. The lowest water occurred on November 14, on which date the Cairo gauge stood 3.4 feet above the low-water of December, 1871, and the Memphis gauge 1.9 feet above the low-water of December, 1872. The heights at Fulton above the low-water of 1879 attained by the three floods of 1880, were as follows: January and March floods, due to the Ohio and its tributaries, 30.08 and 32.5 feet, respectively; July flood, due to the Missouri and Upper Mississippi, 24.08 feet. The low and high water referred to in this report are those of 1879 and 1880, respectively.

With the exception of the erection of the gauges opposite Fulton, all field operations were suspended on October 11, and the work of breaking camp commenced. On October 14 the Thetis was sent to Mound City, Ill., under charge of the steersman, and three days later I disbanded the party and left to report to you at Saint Louis.

The party consisted of a chief assistant, two recorders, five rodmen, two leadsmen, seven boatmen, one cook, one steward, two boys, and the launch crew of engineer, fireman, and steersman. Considerable sickness prevailed, especially during the summer months. One death occurred, that of Mr. B. G. Hall, engineer of the Thetis.

I take pleasure in bringing to your notice the faithful and effective service rendered by my assistants, Messrs. G. S. Davison, C. F. Potter, Seijiro Hirai, W. F. Price, J. H. Davis, A. J. Frith, W. G. Wilkins, J. Ewens, F. W. Tuttle, H. C. Wilson, E. L. Cooley, A. Cobb, H. Phillips, and C. L. Harrison. Mr. Davison's services in organizing the gauging party and systematizing its work were of especial value.

METHODS EMPLOYED.

Cross-section surveys.—The cross-section lines were located at right angles to the general direction of the river, and with the exception of those on the Fulton section and a few at Yankee Bar, were not parallel. On each line signals were erected at the bank, and whenever practicable, on bars and towheads. Each signal was marked with the number of the cross-section and with the letters, A, T, B, or C, according as it was located on the Arkansas or Tennessee shore, or upon the outside or inside of a bar or towhead. In localities where no bar or towhead was crossed by a line, signals were placed back of the shore signals at sufficient distances to give serviceable ranges across the river. At first, board signals, about three feet square and painted white, were used, they being erected on posts or nailed to trees. Later, white cloth signals of the same dimensions, stretched between horizontal strips of wood and erected upon posts, were used. These were found to be much cheaper and much more satisfactory in use, as they showed equally well whether the sun was shining upon their front or rear.

The soundings were taken mainly from the launch, the party consisting, in addition to the crew, of a sextant observer (in charge), a recorder, and a leadsman. The leadsman was stationed upon the small deck in the bow, and the sextant observer directly behind him upon the roof. On crossing a line the shore and back signal, or shore and intermediate signal, as the case might be, appeared to coincide, and the angle between them and some third signal was measured with the sextant and a sounding taken. This third signal was chosen so as to fulfill two conditions: First, to make the observed angle as near 90° as possible, and second, not to be so far distant as to render accurate platting difficult. When soundings were being taken at a considerable distance from the range signals, the instant of crossing a line was given by the recorder stationed behind the sextant observer, field glasses being used for the purpose. On the cross-sections in the Fort Pillow bend, where at certain stages neither intermediate nor back signals could be used, the instant of crossing a line was given by a

flagman stationed at one of the shore signals. Whenever the launch approached a line, he raised his flag, dropping it quickly the instant the sextant observer obscured the opposite signal. The observer, keeping the flagman and a signal coincident in his sextant, took the angle between them the instant the flag was dropped.

In deep water and swift currents the soundings were taken while drifting astern, care being taken to allow the launch to acquire the velocity of the current. Between the low and medium stages, in depths not exceeding 25 feet, soundings were frequently taken when the launch was going up stream. The line was read by the leadsman to the nearest half-foot. In a few instances cadenced soundings were taken from a skiff in the shallow water off bars. The position of the shore-line at the extremities of cross-sections was usually obtained by measurements taken from the shore signals. The shore-line between the cross-sections was sketched except in localities where extensive caving was occurring.

The lead lines used were of $\frac{3}{8}$-inch cotton rope, the divisions being marked by leather tags. When new, the lines were tested daily and the necessary corrections made, but after being in use for a few months their lengths were found to remain sensibly unaltered. A brass jack-chain, 100 feet in length, was used successfully until lost by its breaking near the surface while taking a deep sounding. Two sizes of sounding leads, weighing, respectively, 12 and 16 pounds, were used, the latter being employed in deep water and swift currents. On all surveys, except that made at low-water, the character of the bottom was obtained at every sounding, the leads being greased for the purpose. The sand and gravel obtained were classified as follows: Over $\frac{1}{2}$ inch in diameter, coarse gravel; between $\frac{1}{10}$ and $\frac{1}{2}$ inch, fine gravel; between $\frac{1}{500}$ and $\frac{1}{10}$ inch, coarse sand; and under $\frac{1}{500}$ inch, fine sand.

The limit to the distance between consecutive soundings was 100 feet on the Craighead section and 75 feet on the Bullerton and Fulton sections. In all cases, however, where abrupt changes were found on the bottom, these distances were very much reduced. The average distance apart of the soundings taken during the year was about as follows: Bullerton section, 65 feet; Craighead section, 77 feet; and Fulton section, 56 feet.

On the wide river the steersman was not always able to estimate correctly the proper distance apart of the soundings, thus causing gaps at times exceeding 100 feet in length. This was especially the case when a strong wind was blowing or when the direction of the currents was variable, as was frequently the case on the Bullerton section. To obviate this difficulty, tables were constructed, by means of which the recorder could ascertain the distances apart of the consecutive soundings, so that in case the limit was exceeded an intermediate one could be taken. The manner of constructing and using these tables was as follows:

TABLE No. 1.

	1 A	2 A	3 A	&c.	1 T	2 T	&c.
	Feet.	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*
Cross-section No. 1	.....	900	2,100	.....	.....	500	.....
Cross-section No. 2	900	.....	1,100	.....	500	.....	.....
Cross-section No. 3	2 100	1,200	.....	.....	900	850	.....
&c., &c	.....	.....	.....	.....	.....	.....	.....

TABLE No. 2.

Distance.	25°	30°	35°	40°	45°	&c.	90°
	° ′	° ′	° ′	° ′	° ′	.....	° ′
300 feet	3 01	4 10	5 24	6 48	8 08	.....	18 26
400 feet	2 20	3 14	4 15	5 16	6 21	.....	14 02
500 feet	1 54	2 38	3 27	4 16	5 11	.....	11 18
600 feet	1 36	2 13	2 51	3 40	4 24	.....	9 27
&c	.....	.....	.....	.....	.....	.....	.....

Table No. 1 gives the perpendicular distance of each signal from all the cross-section lines in the locality. Table No. 2 is formed by assuming the angle ABD (Fig. 7, plate 2) to have in succession all the values given in the upper horizontal column, and the perpendicular AD to have in succession all the values given in the left-hand vertical column. For each case thus formed the distance AB is calculated, and the distance BC (equal to 75 or 100 feet, according to the locality) added to it. The angle ACD is then computed, and the difference between it and ABD found and entered in the table.

To illustrate the method of using the tables, suppose the angle ABD locating a sound at B has been measured by the sextant observer and found to be 45°. The recorder, first by table No. 1, ascertains the perpendicular distance from the signal D to the cross-section being sounded. Then by reference to table No. 2 he finds the angle corresponding to this distance and 45°, which we will assume to be 30′. He then knows that the next angle taken should not exceed 45° 30′, if the launch is proceeding towards A, or should not be less than 45° 30′ if proceeding from A. In case the soundings were being taken only when drifting astern, the sextant observer would note the angle when crossing the cross-section line going up-stream, and the recorder would then indicate to the steersman the proper position for the next sounding.

The sextant used was manufactured by Spencer, Browning & Rust, of London. It had a limb of 7-inch radius and read to minutes.

A few cross-section surveys of the Fulton section were made by the gauging party, the soundings being taken from a skiff and located by a transitman on shore.

Longitudinal surveys.—During December attempts were made to take longitudinal soundings, commencing at a fixed point and extending along a fixed line. The first experiments were made in the main river off the foot of Osceola Bar, on two lines, each 1,200 feet in length, and coinciding with the direction of the current. On each of these lines buoys were placed at an interval of about 300 feet. These were connected by a fine line floating on the surface and tagged at intervals of five feet with bits of cork. The buoys used were beer-kegs, held in position by Chinese anchors. Before repeated soundings could be taken along these lines a rise occurred, and the buoys were carried away by drift-wood. Later, additional experiments were made near Fulton, but the buoys were soon carried away by the floating trees sent down from the caving bank at Bullerton Towhead.

On the longitudinal surveys made during the winter, four lines, extending from the foot of Osceola Bar to the foot of Bullerton Towhead, were run in the main river, and four lines over the Fulton section. On these surveys two lines were sounded from a skiff and two from the launch, the soundings being taken while drifting astern. Each party consisted of a recorder (in charge), a leadsman, a flagman, and, in the case of the skiff, an oarsman. Each leadsman sounded as rapidly as possible, raising his lead only a few feet off the bottom; at every tenth or fifteenth sounding, on a signal given by the flagman, his position was located by three transitmen on shore. It was found, however, that both the launch and skiff drifted somewhat faster than the sub-current, rendering it necessary to check their speed in order to keep the lead-lines in a vertical position. In the case of the skiff this could be done by a skillful oarsman without causing any abrupt changes in velocity, but in the case of the launch it could only be done by starting the engines at intervals, causing a perceptible diminution of speed. It was also found that the launch was much more affected by the wind than the skiff. For these reasons the use of the launch was abandoned on the surveys made after May 6th in connection with the cross-section surveys.

On the surveys made after May 6, the following method was used both on the Bullerton and Fulton sections: A range line (No. 3′, Fig. 3, Plate II) was established 100 feet above the cross-section No. 3, and parallel to it. This line was drawn on the map and the points 1, 2, 3, &c. (10 in number on the Fulton section and 11 on the Bullerton section), fixed. The angles S1A, S2A, &c. between the range and prominent signals were then measured with a protractor and entered into a field-book. Between the cross-section lines, intermediate ranges, shown in the figure, were established.

When a longitudinal line, as No. 5, was to be sounded, the launch with the skiff in tow was run up so as to cross range No. 3′ in the vicinity of point 5. The angle at the point of crossing, between the range and some signal, as S, was measured with the sextant, and by means of the tables previously described the observer could notify the steersman of the distance and direction of the point of crossing from point 5. When the launch, in drifting astern, was found to be crossing the range at this point, the skiff, containing the sounding party, was turned loose. The soundings were commenced on cross-section No. 3, and continued until cross-section No. 6 was reached. The manner of taking and locating them was the same as previously described except that the flagman gave signals only when the 10 range lines were crossed. The position of the leadsman being fixed whenever a signal was given, it was unimportant whether the signal was given exactly on a range line. The launch drifted astern after the skiff, and on the Fulton section the sediment observations were taken from it.

The distance apart of the range lines was 166.6 feet on the Fulton section and about 180 feet on the Bullerton section.

The divergence in the paths of the skiffs on the various surveys is due partly to the changes in the direction of the current, but mainly to the influence of the wind. Owing to the prevalence of windy weather during the year, it was deemed best to suspend operations only when the wind made a rough river. In accordance with your instructions, the time of crossing each cross-section line was noted by a timekeeper stationed in the sounding skiff. These times, however, do not represent the velocity of the surface current, owing to the skiff being influenced by the wind, and owing to the

necessity before mentioned of gently checking its speed. All soundings on these surveys were taken to the nearest quarter foot. The average distance apart of the soundings was about as follows:

	Feet.
Bullerton section, low water	4
Bullerton section, high water	14
Fulton section, low water	4
Fulton section, high water	25

Discharge observations.—The location of the gauging section is shown in Plate I. The river in its vicinity has a nearly uniform sectional area, is free from eddies, and flows between parallel banks which were at no time during the observations overflowed. The shape of the section shown in Fig. 1, Plate II, will be seen to be nearly trapezoidal, deep water being found near each bank. On one survey, when the mean depth was about 38 feet, the maximum variation in depth between points 350 feet from each shore was only 9 feet.

The position of the various lines and signals established in the vicinity of the discharge section are shown in Fig. 5, Plate II. The four parallel lines, BI, CJ, DK, and EL, were placed 100 feet apart, and a base line, AD, 1,000 feet in length, laid off at right angles to them. M, N, O, and P were range signals, by means of which the leadsman could note when a line was being crossed. A, C, D, and E were the instrument points over each of which a house of sufficient size to shelter the observer and instrument was erected. 1, 2, 3, &c., were the points (26 in number and 91 feet apart) at which the floats were to be let loose. Their position was fixed by means of the range signals on the line BI, and those Q, R, S, T, on the left bank below the discharge section. During the low stage of 1880, buoys were placed at the points 21, 23, and 25. Between A and E a telegraph line was erected which was worked by a three-celled Grenet battery at D. At each of the four instrument points a key and sounder were placed in the circuit.

In accordance with your directions, tin double floats, run at mid-depth, were used in these observations. The sub-surface floats (Fig. 6, Plate II) were similar to those used by General Ellis on the Connecticut River, with the exception that the air-chamber AA was comprised wholly in the upper half, and that the lead BB at the bottom was distributed on the inner circumference in the form of a band. Their height and outside diameter were each 8 inches. The surface floats were very flat semi-elipsoids. Their height was 1.2 inches and diameter 8 inches. At first, copper wire, 0.018 inch in diameter, was used to connect the floats, but owing to the difficulty of manipulating it and owing to the loss of numerous floats, due to its breakage, fine silk cord was substituted for it.

The manner of taking a float observation was as follows: When a float was to be run from a point, as 12 (Fig. 5, Plate II), the assistant in the skiff made the length of the connecting rod equal to half the depth of G. This depth was obtained by correcting the sounding taken at G on the previous observation for the oscillation of the river, it having been found that the changes on the bottom occurred so gradually as to introduce no material error. On letting loose the float, the assistant gave a shout, whereupon the observer at A found the float with his telescope and kept it in the field of view by moving his telescope with his hand. As the float approached the line CN the observer at C gave two clicks upon his key, upon which the observer at A clamped his instrument and kept the float and cross-wire coincident by means of the tangent screw. On the observer at C giving a final signal as the float crossed his line, the observer at A ceased to move his tangent screw and read and recorded the angle FAC. The angles GAC and HAC were obtained in a similar manner. No angles were taken by the observer at C, D, or E—they using their instruments simply to note the passage of the floats over their respective lines. The skiff drifted astern directly behind the float, and soundings were taken on the three lines as they were crossed. Owing to the flat river-bed in this locality, these soundings were sufficient to give accurately the profiles of the sections.

The time occupied by the floats in passing between the lines CJ, DK, and EL were noted by the observer at E, two stop-watches, reading to fourths of a second, being used for the purpose. Both were started when the final signal from the observer at C was heard, and they were stopped in succession when the final signals at D and E were given. The length of time that the float was immersed before reaching the line CJ was noted by the observer at D with an ordinary watch.

Several times during each observation the assistant in the skiff, while drifting astern after the floats, obtained the velocity of the wind by means of an anemometer. This instrument was allowed to run one minute, and was so held that the plane of its wheel was as near as could be judged at right angles to the direction of the wind. The direction of the wind, the state of the weather, and the condition of the river surface were noted by the observer at A.

Two skiff parties were generally employed in putting out the floats, one rowing up stream while the other was drifting down. These parties commenced at opposite

shores and worked out til they met in mid-stream. At low and medium stages they could proceed directly up stream, but at a high stage it became necessary to pull to the shore after each float was recovered, and to row along the bank for several hundred feet above the discharge section. During the high stage the floats were somewhat irregularly distributed over the river, owing to the fact that if, in dropping down stream, a skiff was found to be out of the desired position on the line BM, the oarsmen were unable to stem the current to remedy the matter.

During extreme high-water, the river covered the station at A, rendering it necessary to establish a new one 1,000 feet below the discharge section. This new station was used until the close of field work. During the subsidence of the spring freshets, 46 feet of caving occurred on the right bank of the discharge section.

The average time of an observation varied from 1.2 hours at low to 3 hours at high water.

The work of computing the discharges was performed at this office under your immediate direction. To add to the completeness of this report the method adopted is given.

The mean velocity of each float was taken as the mean of its velocity over the upper and lower 100 feet, found from its actual path and observed time of transit. Owing to the close agreement between the areas of the three cross-sections, that of the middle one only was computed. This was done by means of a planimeter and was checked by means of the sum of the partial areas into which it was divided. These partial areas, seven to nine in number, were not taken so as to have equal widths, but were so selected by the computer that the mean velocity in each would, in his judgment, be the mean of the velocities comprised within it. The product of each partial area by the mean of the velocities within it was then computed and the sum taken as the discharge. The discharge divided by the area gave the mean velocity.

Vertical velocity observations.—These observations were made from a skiff anchored at least 100 feet above the line CJ (Fig. 5, Plate II). The position of the observers and the manner of ascertaining the path and time of the floats were the same as previously described.

The floats having been made ready, were let out as rapidly as possible, no particular order of depth being observed. It was found that in depths exceeding 45 feet the surface float generally sank, owing probably to the collapsing of the subsurface float. For this reason the velocity near the bottom could not be ascertained in many of the observations. During high-water, when heavy drift was running, no observations were taken, owing to the danger of anchoring in the stream. In 13 observations the floats were run at every foot in depth, in 21 at every 2 feet, and in 1 at every 3 feet.

Copper wire 0.018 inch in diameter was used to connect the upper and lower floats.

The direction and force of the wind was obtained by the observer in the anchored boat.

Transverse velocity observations.—Five observations for the determination of the transverse curves of velocity were made during the year, four in the straight reach above Fulton and one in the Fort Pillow Bend. The velocity of only a surface stratum 6 feet in depth was observed, the wooden rods used being weighted with lead so as to have that depth of immersion. At first the diameter of the rods was five inches, but later this was decreased to three inches. In both cases the portion protruding (1 foot in length) was tapered from the water surface to the top. Each rod was oiled and painted and a small flag was attached to its top.

On the observations in the Fort Pillow Bend the rods were run over three parallel sections 100 feet apart. The central section coincided very nearly with cross-section No. 22. On the Arkansas end of these lines were stationed three transitmen, who raised flags as the rods approached their respective lines and dropped them the instant of their passage. A fourth transitman, stationed at Fort Pillow Landing, took angles on the rods at their instant of passage, the signals being given to him by an assistant. A second assistant stationed near him noted the time with two stopwatches. Previous to the observation the central cross-section was carefully sounded.

On the observations made on the Fulton section the rods were run over three groups of parallel sections, each consisting of three lines. The central lines of these groups were cross-sections Nos. 2, 3, and 4. The manner of observing the passage of the rods was the same as that described above. On three of the sections transits were placed; on the remainder suspended plumb-bobs were used instead. The observer, by standing a short distance behind a plumb-bob and sighting along the line to the signal on the opposite bank, could note the passage of the rods across the section. The transitman, by whom the passage of the rods was located, was stationed on the left bank 1,000 feet below the discharge section. A skiff drifted after each rod, and soundings were taken as the central cross-section of each group was crossed.

On the Fort Pillow observation 33 rods were run in the width of the river; on those near Fulton about 20.

Sediment observations.—These observations were taken in eight vertical planes, com-

mencing 200 feet above the discharge section and extending down stream parallel to the current. In each of these planes 2 measured samples of 2 ounces each were taken at the surface, at mid-depth, and as near the bottom as practicable. Eight samples taken from the corresponding depth were combined into a 16-ounce bottle, while of the remaining samples the three taken in the same vertical were combined into a 6-ounce bottle. These bottles, after having all the necessary data placed upon them, and after having their stoppers sealed, were forwarded to Saint Louis for analysis.

The eight vertical planes commenced at the points 3, 6, 9, 12, 15, 18, 21, and 24 (Fig. 5, Plate II). These points being fixed by means of intersecting range lines, the corresponding vertical planes in the different observations were practically identical.

When the skiff or launch was found to be in a proper position for an observation it was allowed to drift astern, and as soon as it acquired the velocity of the current a sounding was taken and the surface and bottom samples secured, the former with a pail, the latter with the slip-bottle. The contents of the slip-bottle were immediately emptied into a pail and the mid-depth sample obtained. The 2-ounce bottles were at once filled from the pails before the water had an opportunity to settle.

In emtying the 2-ounce bottles into the larger ones they were first partially emptied and then violently shaken before being completely emptied. In cleansing the bottles filtered water only was used.

The slip-bottle used consisted of a hollow iron cylinder, which was closed at its upper end, and which played upon a vertical axis. To this axis were fastened two iron disks, whose distance apart was equal to the height of the cylinder. When the bottle was lowered into the water the cylinder was raised, and when immersed to the proper depth was made to fill by means of a catch worked by a string, thereby securing a sample of the water at that depth. The height of the cylinder was about 6 inches, its external diameter about 8 inches, and its capacity about 175 cubic inches.

The weight of sediment contained in the sample was obtained at this office under your immediate supervision. The method employed was as follows:

The filtering papers, the best Swedish, were cut of uniform size on a tin quadrant, and after being allowed to remain for a day in a dry place, were weighed in the following manner: Two papers were taken as standards, and were made to balance exactly by cutting in scales that break at one milligram. One standard, which will be called R, was kept in the scale-pan throughout the process, while the remaining one, L, was kept among the papers to be weighed. The requisite number of papers for the combination to be treated were then separately balanced against R and the difference of weight recorded, 200 milligrams being the greatest discrepancy allowed. L was also balanced against R, about every sixth paper weighed, the difference being noted and applied as "correction for moisture" to the difference between each paper and R. The amount of water in each bottle of the horizontal combination was then measured in a graduated glass, and three-eights of the mean value of this amount was assumed as the contents of each bottle of the vertical combination. The bottles were then emptied into the filters, rinsed with filtered water, and again emptied. The filters, after being covered, were allowed to stand 12 hours, after which they were submitted to a furnace heat of 120° Fahrenheit for about three hours. The standards L and R had filtered water run through them, and were dried with the other papers.

After the drying process the standards were balanced against each other and the difference, if any, noted. Each paper is then balanced against R, L being used, as before, to determine "correction for moisture". The difference between the differences before and after filtering in the weights of each paper and R gives the weight of the sediment sought.

Slope.—The slope observations made by the gauging parties were taken on the straight reach at Fulton. On the right bank eleven signals, designated by the letters A to K (see Plate I), were erected, and bench marks established as close to them as possible. The distance apart of these signals was 1,000 feet, with the exception of between A and B, where the interval was 1,355 feet. Several lines of levels were run between the bench marks and the mean values of the elevations adopted. The mean of the values of the probable errors between consecutive bench marks was 0.00054 feet; the maximum probable error was 0.00132 feet.

The form of the stake used is shown in Fig. 4, Plate II. It was made of oak; was about 3 feet long and 3 inches square, and had an iron band fitted to its head. An L-shaped piece of round iron was driven into it as shown in the figure.

When an observation was to be made, these stakes were driven simultaneously opposite the signals until the L-shaped iron coincided with the water surface. The stakes were so placed that these irons either faced out or up stream. As soon as possible after the stakes were driven levels were taken to ascertain their distance below the bench-marks. Five of the stakes, among which were the upper and lower ones, were driven by the officers of the gauging party; the remainder were driven by the boatmen and inspected as soon as possible by the officers.

On the subsidence of the March rise, it was found that the bank on the Arkansas shore was too soft and muddy for accurate work, and the observations were accord-

ingly transferred to the Tennessee shore. The location of the new signals, which were designated by the letters Q—Z, is shown in Plate I. The distance between them was 1,000 feet.

With but one exception the slope observations were made on days in which discharge floats were run. The latter work was usually commenced immediately after the stakes were driven.

The fall of the river surface between Driver's and Tanza's Landings and Fulton were ascertained by a comparison of the gauge readings taken at these localities. The reading of the Fulton gauge at the time either of the others was observed was obtained by interpolating between its tri-daily readings. In erecting the gauges, the bench-marks established by the party previously located on the reach were used. Their system of levels extended along both banks from Elmot Bar to the Randolph Narrows, crossing the river at both localities, and closing with an error of .033 foot. The velocity of the river at the gauges was about the same, except at the low stage, when, owing to the closing of Osceola Chute, the current past the Driver's Landing gauge became very slack.

The distances between the gauges are as follows:

	Miles.
Driver's Landing to Tanza's Landing	2.8
Tanza's Landing to No. 18, Craighead Point	2.9
No. 18, Craighead Point to Fulton	5.1

These distances have been measured along the main channel line, except between Driver's and Tanza's Landings, where the distance along the chute channel has been taken.

Dredgings.—In securing samples of the bottom, an iron dredge, 1.5 feet in height and 0.87 foot in diameter at its top, and 1.25 feet near its bottom, was used. In order to allow the escape of water while being raised, it was pierced with small holes to within 6 inches of the bottom, and in order to enable it to catch into the river-bed, a heavy iron ball was attached to its top by a chain. This dredge was used only from the launch. All the dredgings were taken on cross-section lines and their position located by a sextant.

The quantity of material brought up by the dredge varied from 100 to 2,000 cubic inches. From its contents 28 cubic inches were retained and the percentage of gravel, &c., in it ascertained. The scale adopted was as follows:

Coarse gravel, over	.75 inch in diameter.
Medium gravel, over	.25 to .75 inch in diameter.
Fine gravel, over	.1 to .25 inch in diameter.
Coarse sand, over	.01 to .1 inch in diameter.
Fine sand, below	.01 inch in diameter.

The separation of the gravel into its different grades was effected by means of sieves having holes 0.1, 0.25, and 0.75 inch in diameter. The diameter of the sand was approximately determined by means of a micrometer and lens.

Caving banks.—At all cross-sections where caving was occurring, marked stakes, 50 feet apart, were placed on the line back of the signals. Before the caving reached a signal, the measurements, which in all cases were taken to the edge at the top of the bank, were made from it. After it was carried away the measurements were taken from the nearest stake. Whenever it became necessary to replace a signal, the distance between its new and old location could easily be obtained from these stakes. In several localities, when rapid caving was occurring, lines of stakes were placed between the cross-sections.

The manner of computing the area and volume of caving was as follows: Upon the development of the shore-line as a base, ordinates, representing the width of caving at the various cross-sections, were erected, and a free-hand curve drawn through their extremities. The area between this curve and the base represented the area of the caving along the shores. This area, divided by the length, of the base, gave the mean width of caving. The area of caving on any cross-section was obtained by multiplying the width and mean depth of the erosion. This mean depth was derived from an inspection of the cross-section before and after the caving. In some cases it was equal to the depth from the surface of the bank to the bed of the river, while in others, owing to the caving merely wearing away the top of a bluff bank it was much less. Upon the development of the shore-line as a base the area of caving at the various cross-sections were platted as ordinates, and a free-hand curve drawn through their extremities. The area between this curve and the base represented the volume of caving. This volume divided by the area of caving along the shore gave the mean depth of caving over the reach.

Platting.—The method of platting the cross-sections was as follows: Let H (Fig. 7, Plate II) be a cross-section line, the soundings on which have been located by sextant angles between the range and some signal, as E. Through E a line, FG, is drawn

parallel to HI and a protractor placed as represented in the figure. A fine needle is then driven into the drawing-board through E, and a ruler placed so that one of its edges shall touch the needle and coincide on the protractor with an angle locating a sounding on HI. The intersection of the ruler with HI will give the location of this sounding.

On the maps of the Bullerton section each section-line is taken to represent 175.2 feet on the Driver's-Landing gauge, and all gauge-readings given are referred to that gauge. The references on the maps of the Fulton section are to the Fulton gauge, and each cross-section line is taken to represent 170.1* feet on that gauge. Each cross-section is shown as revolved into the plan of the map, the surface-line JP being at a distance above or below the section-line HI, equal to the difference between the gauge-reading at the time of sounding the section and the reading represented by the section-line. By this method the changes in the river-bed can be easily studied; it only being necessary to place the tracings over each other so that the respective section lines and signals shall coincide. It has been assumed that the rise and fall of the river-surface is the same at every point on the Bullerton section, and that the same is true for the Fulton section.

On the map each depth is represented by an ordinate, as LM, and the nature of the bottom as ascertained by the greased lead noted. The positions of the dredgings have been shown on the revolved cross-section, as at N.

On the maps of the Craighead section the cross-section lines have been taken to represent 175.2 on the Driver's Landing gauge, and each water surface line represents the reading of that gauge at the time of sounding, corrected for the change in slope. This correction was obtained by means of a comparison of the slope over the section for a stage of 175.2 on the Driver's Landing gauge with the slope at the time of the survey.

When longitudinal surveys were made in connection with the cross-section surveys, the paths drifted over by the skiffs were shown on the cross-section maps, the located soundings being represented by small circles. These paths were then developed upon a separate sheet, and the longitudinal soundings platted. For purposes of comparison these developed lines were taken to represent the same gauge-reading as the section-lines on the cross-section maps. The position of the surface-lines with reference to the developed line was found in the manner described above. The following are the scales to which the maps have been drawn:

	Horizontal.	Vertical.
Fulton section:		
Cross-section	$\frac{1}{2400}$	$\frac{1}{360}$
Longitudinal	$\frac{1}{1200}$	$\frac{1}{360}$
Bullerton section:		
Cross-section	$\frac{1}{6000}$	$\frac{1}{480}$
Longitudinal	$\frac{1}{1200}$	$\frac{1}{240}$
Craighead section:		
Cross-section	$\frac{1}{12000}$	$\frac{1}{600}$

RESULTS.

Discharge.—The relation between the gauge heights and the discharge, mean velocity, and areas are shown in Fig. 1, Plate IV. In this diagram the zero of the gauge-readings has been placed at a distance below low-water equal to the mean depth (28.77 feet) of the discharge section at low-water. The areas below datum have been taken with reference to a datum line 14 feet above low-water.

An inspection of the diagram shows that the points representing the observed mean velocities lie nearly on a straight line, AB; and that with the exception of at extreme high-water, the points representing the water areas also fall along a straight line, CD. The equations of these lines are, respectively:

$$v = 0.204\,(h - 21.8)$$

and

$$A = 2700\,(h - 4.8)$$

in which v = mean velocity in feet per second; A = water area in square feet; and h = gauge heights. The equation of the straight line DE is:

$$A = 1492\,(h + 35.8)$$

The more rigid method of giving the center of gravity of groups of points gives irregular lines coinciding quite closely with the direction of the straight lines AB and CD.

* The low-water of 1879 read 156.12 on this gauge.

The relation between the gauge heights and the mean velocities being represented by straight lines, it follows that the relation between gauge heights and discharge will be represented by the product of two straight lines or a parabola. The equation of this parabola was found by the following method: Each discharge was divided by the corresponding gauge heights, and the quotient platted to the latter. The points obtained lay nearly on a straight line. As the points on a rising stage were found, with few exceptions, to exceed those at corresponding stages on a falling river, a straight line was selected which separated as far as possible these two sets of points, and this line was assumed to represent the quotient of discharge by gauge height for a stationary river. Its equation was—

$$\frac{D}{h} = 502.27\,h - 10950$$

in which D = discharge in cubic feet per second. Clearing of fractions the equation of the parabola shown in the diagram results—

$$D = 502.27h^2 - 10850h$$

This parabola cuts the ordinate of zero discharge at two points; one at the origin of gauge heights and the other at a depth of 5.97 feet below the low-water surface. Between these points the discharges are negative, showing that this part of the curve is imaginary. The axis of the curve is horizontal and lies midway between these points. Above 55 feet on the gauge the discharges increase less rapidly than indicated by the parabola, a circumstance due to the water areas at that stage increasing less rapidly than the straight line CD. For this portion of the gauge the relation between the gauge heights and discharge is represented by a straight line GH, whose equation is—

$$D = 36577\ (h - 29.93)$$

The point F at which the parabola cuts the ordinate of zero discharge is the point at which the discharge would cease should the water fall to that level. The depth of this point below the low-water surface almost exactly equals the minimum mean depth (6.0 feet) on the Bullerton section at low-water. From the survey between Fulton and Randolph, made in 1879, at a stage of 9 feet above low-water, it appears that the minimum mean depth below Fulton occurs at a cross-section immediately above the mouth of Chute No. 34. Subtracting from the area of this cross-section the product of 9 feet by its width, and dividing the remainder by the width, the mean depth at low-water was found to be 5.3 feet. This assumes the bottom to remain unchanged; a scouring action similar to that noticed on the Bullerton section doubtless occurred by which the mean depth was increased to between 6 and 7 feet.

The fact that the discharge would cease at a depth below low-water equal to the mean depth at that stage at the bar above and below the observing station indicates the existence of another factor heretofore overlooked in the gauging of rivers. The observing station at Fulton is situated in a pool between two bars, as is shown in the sketch in Plate IV. The lower bar acts as a weir or dam, and upon its mean depth and form depend the facility with which the water in the Fulton pool can be drawn off. The depth of the bar above regulates the influx of water into the Fulton pool, as the greater its depth the greater the rapidity with which the water in the Plum Point pool will be lowered. Both these considerations must have influenced to a considerable extent the values of the mean velocities and discharges.

The irregularities in the areas below datum are due to two causes: the action of the river in deepening or shoaling its bed and the changes in the profile caused by the passage of sand waves. In the latter case errors must result from considering the entire sectional area as effective, as at times there may be large crests immediately above it causing vertical eddies. This error could be much reduced by sounding several consecutive cross-sections and taking a mean result.

The areas below datum show a gradual increase from low to mid-stage, and a decrease, very marked at the extreme high-water of March, above mid-stage. This action of the river is not entirely "borne" out by the mean datum area curve shown in Fig. 6, Plate I. These areas were obtained under your direction by dividing the areas below datum of four or five cross-sections, 500 feet apart (the discharge section being one of them), into forty points of division, and taking a mean of the depths at the corresponding points. The mean datum width of the sections was then divided into forty points of division and the mean depths obtained platted and the area measured with a planimeter. The figure shows that the mean datum areas decreased from low to high water, and this action, being deduced from observations on several cross-sections, is entitled to more confidence than any result obtained from the dischage section alone. Whether the rapid shoaling of the river at the discharge section at the high stage of March was general over the Fulton section cannot be ascertained, as the surveys from which the mean datum areas were obtained were not taken at short intervals. While they show a fill from the beginning to the top of the March rise, a theory

for which has already been submitted, still they do not show whether this fill occurred gradually or whether it was more rapid at the higher stage.

This rapid shoaling at extreme high-water has a direct bearing upon the levee question, and it is to be regretted that it was not ascertained whether this action was general over the whole Fulton section, or merely local and confined to the discharge section. The river at this time was over its banks in the vicinity of Flower Island and was filling up the interior of Plum Point Bend; the sloughs between Sans Souci and Craighead Point were also taking water from the river and discharging it into the swamps between Tanza's Landing and Chute No. 34. Had this water been confined to the river by levees the discharge and mean velocity would have been increased at Fulton and a deepening, instead of a shoaling, action might have occurred.

The causes which lead to the variations in discharge and mean velocity may be summarized as follows:

I. The passage of sand waves, by which the effective area of the discharge section is frequently rendered less than the observed area.

II. The deepening or shoaling of the river bed, by means of which the area is rendered variable for any given gauge reading.

III. Variations in the depth and form of the bars above and below, by which the influx and efflux of water into and out of the Fulton pool is caused to vary.

IV. The influence of a rising or falling river in increasing or decreasing the velocity and discharge.

V. The unavoidable errors of observation.

As will be noticed in the discussion of the slope, the observations do not show that an increase or decrease of slope occurs on a rising or falling stage; that the discharge is affected by the oscillations of the river seems well established, as about 75 per cent. of the observations taken on a rising stage fall to the right of the parabola, and even a greater percentage of those taken on a falling stage to the left. In investigating this subject the differences between the observed discharges and those given by the parabola were computed and tabulated. An inspection of these differences showed that they varied with the rate of rise and fall and with the height of the crest or rear of a wave; also, that when a series of small falls, as C, D, and E (Fig. 3, Plate III), occurred on the crest of a wave, the discharge at first greatly exceeded that at a corresponding stage on its rear, but afterwards approximated to it. The following data is given to illustrate this case:

	Observed discharge, per second.	Discharge computed from parabola, per second.	Difference, per second.
	Cubic feet.	*Cubic feet.*	*Cubic feet.*
Fall at C	263,750	221,715	+42,035
Fall at D	678,247	631,850	+46,391
Fall at E	843,963	844,970	− 1,007
Fall at E	810,044	834,340	−24,296

When small rises, as at K and H, occurred on the rear of a wave, the discharge was less than that at the corresponding stage on its crest, and this difference was greatest for the first rise, as K, than for the second, as L. An example of this case is appended:

	Observed discharge, per second.	Discharge computed from parabola, per second.	Difference, per second.
	Cubic feet.	*Cubic feet.*	*Cubic feet.*
Rise at K	699,828	714,500	−14,672
Rise at K	722,100	744,000	−21,900
Rise at K	728,540	751,000	−22,460
Rise at L	737,214	728,500	+ 8,714
Rise at L	809,239	819,500	−10,261
Rise at L	850,774	848,500	+ 2,274
Rise at L	876,614	885,500	−11,886
Rise at L	894,830	900,500	− 5,670

The gauge-curve, shown in Plate III, was then divided into what will be termed main rises, main falls, subrises and subfalls, the first terms denoting the crest and rear of a wave, and the latter the small oscillations of short duration occurring on the former. This division was as follows:

	Date.	Height.
		Feet.
Main rise:		
No. 1	November 13 to January 19	30.1
No. 2	February 12 to February 29	18.9
No. 3	March 10 to March 26	2.1
No. 4	May 30 to June 9	3.9
No. 5	June 20 to July 11	10.9
No. 6	August 28 to September 14	4.2
No. 7	October 3 to October 9	0.9
Main fall:		
No. 1	January 19 to February 12	18.1
No. 2	February 29 to March 10	0.9
No. 3	March 26 to May 30	19.5
No. 4	June 9 to June 20	3.3
No. 5	July 11 to August 28	19.5
No. 6	September 14 to October 3	4.6
Subrise:		
No. 1	April 19 to April 25	1.3
No. 2	April 29 to May 8	5.0
Subfall:		
No. 1	November 24 to November 30	2.0
No. 2	December 20 to December 25	3.1
No. 3	January 4 to January 9	1.4
No. 4	July 1 to July 3	0.4

This division is in part a matter of judgment. The only rules that can be laid down are that a rise or fall, even of very small height, must be considered as a main one, if it extends over a considerable time, and that when the height of the crest and rear of a wave are about equal it must be treated as a main rise and fall. Rise No. 3 and fall No. 2, on the top of the March rise, are examples of the first rule, and waves I and L of the second.

The following values for correcting the discharge, computed from the parabola, or straight line for the increase or decrease due to oscillations of the river, were then found by trial:

For main rises, add ..... $60a^2\sqrt[3]{c}$

For main falls, subtract ..... $60a^2\sqrt[3]{c}$

For subrises, subtract ..... $60a^2\sqrt[3]{c} - 10000\sqrt[3]{A'}$

For subfalls, add ..... $60a^2\sqrt[3]{c} - 10000\sqrt[3]{A'}$

In these values a = height of the crest or rear of a wave; A', the height of a subfall or subrise, and c = variation in gauge heights in the 24 hours preceding the mean time of an observation. The values of c are given in Table 1, Appendix.

A comparison between the computed and observed discharges exhibits the following results:

Deviation of the computed from the observed discharges—

	Straight line.	Parabola.	Parabola and straight line.
Number of observations in which the error was less than 1 per cent	6	52	58
Number of observations in which the error was less than 2 per cent	15	95	110
Number of observations in which the error was less than 3 per cent	19	126	145
Number of observations in which the error was less than 4 per cent	23	145	168
Number of observations in which the error was less than 5 per cent	24	164	188
Number of observations in which the error was less than 6 per cent	24	170	194
Number of observations in which the error was less than 7 per cent	25	172	197
Number of observations in which the error was less than 8 per cent	25	176	201

The sum of the computed discharges for the year differ from the sum of the observed discharge by 0.3 per cent.

The difference between the observed velocity and that given by the parabola was a maximum during the first part of the rise that succeeded the low-water stage of November. In one instance the former exceeded the latter by 24 per cent. This increase was due to an increase in mean velocity, as no noticeable increase in datum area occurred.

The following table, compiled by Assistant W. M. Childs, gives the discharge of the river for the year ending November 13, 1880. The discharges on days in which no observations were taken were computed by means of the formulæ given.

Discharge at Fulton for year ending November 13, 1880:

	Millions of cubic feet.
November 13 to 30, 1879	324,258
December, 1879	1,439,809
January, 1880	2,421,082
February, 1880	1,709,941
March, 1880	2,838,360
April, 1880	1,991,222
May, 1880	1,625,955
June, 1880	1,179,319
July, 1880	1,564,509
August, 1880	594,588
September, 1880	557,255
October, 1880	319,241
November 1 to 13, 1880	197,151
Total	16,762,691

The average discharge per second during the year was 530,089 cubic feet. The maximum discharge occurred on March 24, and was 1,117,425 cubic feet per second. The low-water discharge, computed from the equation of the parabola, was 83,260* cubic feet per second.

Vertical velocity observations.—In reducing these observations from the field notes, the velocity of each float between the upper and middle, and middle and lower sections was first determined by dividing 100 feet by the respective times of transit. The mean of these two results was then taken as the velocity of the float.

In all the observations there was more or less divergence in the paths of the floats, due partly to boils and partly to the influence of the wind upon the upper float. In deducing the velocity from the perpendicular distance between the section lines, the effect of the component of the wind and boils perpendicular to the current is eliminated.

The divergence of the floats causes them to run at varying distances from the shore, and hence to be affected by the change in horizontal velocity. This error, however, is slight, and probably does not exceed that of observation.

The results of the observations are given in Table 1, Appendix.

The depth of water at the sections was in all cases practically the same; that given is for the middle one.

In deducing the force of the wind the component parallel to the cross-section has been disregarded. The value given in the tables (in miles per hour) is the relative velocity of the component parallel to the current with reference to the moving floats, the mean velocity of the latter being taken in each observation. Thus a wind blowing down stream with a velocity equal to that of the floats would be entered in the table as "calm."

In each observation the mean distance of the floats from the left base has been taken as the distance out of the vertical plane. The distance of this base from the water's edge varied from —25 feet in No. 8 to +52 feet in No. 34.

The depths are given in feet, and the velocities in feet per second.

Mean curves.—The observations given above were first plotted on cross-section paper, showing the velocities at the various depths in each vertical plane, and the extremities of the ordinates representing these velocities were then joined by straight lines. (See figures 1, 2, and 3, Plate V.) The ordinates at the surface at .033D†, .067D, .1D, and every half tenth beyond to .85D, were then scaled, and the arithmetical mean computed for each depth. In three observations the velocities were not taken as low as .85D, and the velocity at that depth was found by drawing from the lowest point toward a line coinciding with the general direction of the points above and measuring to this. Observation No. 2 has not been used in obtaining the mean curves, as the greatest depth at which velocities were taken did not exceed .8D.

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*The value 79,000 cubic feet per second, given in a previous report, was deduced before this subject had been fully investigated.

† D equals total depth; by .033D is meant a depth below the surface equal to one-thirtieth of the total depth.

The following is a list of the mean curves obtained:

First. For all sections taken when the height above low-water did not exceed ten feet. (Fig. 4, Plate V). In this case the mean velocity at .9D could be obtained.

Second. When the height above low-water varied from ten to twenty feet. (Fig. 5.)

Third. When the height above low-water exceeded twenty feet. (Fig. 6.)

Fourth. When the wind was blowing down stream. (Fig. 7.)

Fifth. When the wind was blowing up stream. (Fig. 8.)

Sixth. A grand mean of all the observations.

The points marked in circles in figures four to nine, both inclusive, are the means of the subsurface velocity measurements. The results shown by their inspection is that the form of the vertical velocity curve varies with the direction and force of the wind. In all the curves except that shown in Fig. 7, the resultant wind is up stream, and the upper currents are retarded, and the lower correspondingly accelerated.

In these cases the curves are best represented by an elliptic arc near the surface and a tangent below. The position of the axes and the points of tangency are shown in the figures. The observations made during down-stream winds, though few in number, are still sufficient to show that the upper currents are accelerated, especially at the surface, and the lower retarded. The curve in this case becomes a parabola, with its axis coinciding with the surface. During a calm the curve would be found between this parabola and the arc and its tangent. For a very heavy down-stream wind the curve might become a straight line, having considerable inclination to the vertical; while for an up-stream gale the retardation of velocity near the surface might be sufficient to make the curve nearly vertical below mid depths.

In the low-water mean it was found that a parabola, with its axis horizontal, and about .15D below the surface, gave as good results as the arc and tangent.

Table No. 2, Appendix, shows the differences between the observed and computed points on the mean curves.

The notation adopted is as follows:

C = velocity at vertical axes of ellipse.
A = semi-axis of ellipse parallel to surface.
B = semi-axis of ellipse perpendicular to surface.
v = velocity in feet per second at a depth d.
d = depth below surface expressed in decimals of the total depth.
d_t = depth of point of tangency below surface.
d_A = depth of horizontal axis of ellipse below surface.
d_m = depth of thread of mean velocity below surface.
V_m = mean velocity in vertical plane.
$V_{\frac{1}{2}}$ = mid-depth velocity in vertical plane.

The equation of the ellipse is—

$$V = C + \sqrt{A^2 - \frac{A^2}{B^2} d^2}$$

Mean curve for low stage (Fig. 4, Plate V), No. 1, Table 2, Appendix.

C = 1.46, A = 1.36, and B = 0.46.
Equation of straight line $V = 2.919 - 0.719d$.
$d_t = 0.267D$.
$d_A = 0.167D$. $V_m = 2.552$ feet.
$d_m = 0.510D$. $V_{\frac{1}{2}D} = 2.560$ feet.

Mean curve for medium stage (Fig. 5, Plate V), No. 2, Table 2, Appendix.

C = 4.03, A = 0.345, and B = 0.230.
Equation of straight line $V = 4.627 - 1.16d$.
$d_t = 0.29D$.
$d_A = 0.14D$.
$d_m = 0.529D$.
$V_m = 4.014$ feet.
$V_{\frac{1}{2}D} = 4.047$ feet.

Mean curve for high-water stage (Fig. 6, Plate V), No. 3, Table 2, Appendix—

C = 5.53, A = .21, and B = .14.
Equation of straight line, $V = 5{,}957 - 1.1573d$.
$d_t = 0.230D$.
$d_A = 0.14D$.
$d_m = 0.523D$.
$V_m = 5.352$ feet.
$V_{\frac{1}{2}D} = 5.378$ feet.

Mean curve for down-stream winds (Fig. 7, Plate V), No. 4, Table 2, Appendix—

Equation of parabola, $V = 3.73 - 1.1d^2$.
$d_m = .577D$. $d_A = d + = 0$. $V_m = 3.463$ ft. $V_{\frac{1}{2}D} = 3.455$ ft.

Mean curve for up-stream winds (Fig. 8, Plate V), No. 5, Table 2, Appendix—

C = 4.00, A = 4.85, and B = .162.
Equation of straight line, $4.700 - 1.15d$.
d_t = .21D. d_A = .16D.
d_m = .533D.
V_m = 4.086 feet.
$V_{\frac{1}{2}D}$ = 4.086 feet.

Grand mean curve (Fig. 9, Plate V), No. 6, Table 2, Appendix—

C = 3.59, A = 0.69, and B = 0.23.
Equation of straight line, $V = 4.446 - 0.97d$.
d_t = .202D. d_A =0.133D.
d_m = 511D.
V_m = 3.95 feet.
$V_{\frac{1}{2}D}$ = 3.961 feet.

Velocity ratios.—In all the observations where the velocities were obtained below or at .9D, the lowest observed point was joined with the bottom by a line coinciding with the general direction of the points above. The area of the figure formed by the velocity ordinates was then obtained by a planimeter. The quotient of this area by the depth was taken as the mean velocity. The mean velocity of each of the mean curves was obtained in a similar manner, only that the parabola or the arc and tangent were taken as a boundary of the figure, and not the straight line joining the observed points. The depths of the threads of mean velocity were calculated from the formulæ given.

The ratio of mean to mid-depth velocities, in the eighteen observations, were quite variable, as the latter were generally determined by only a single observation.

The following are the results obtained:

	$\frac{V_{\frac{1}{2}D}}{V_m}$	$\frac{V_m}{V_{\frac{1}{2}D}}$	$\frac{d_m}{D}$
Mean of eighteen observations	0.996	1.004	.....
Mean curve, low stage	1.003	0.997	0.510
Mean curve, medium stage	1.008	0.992	0.529
Mean curve, high stage	1.005	0.995	0.523
Mean curve, wind down	1.027	0.973	0.577
Mean curve, wind up	1.009	0.991	0.533
Grand mean curve	1.003	0.997	0.511

In these calculations the assumption has been made that the tangent and parabolic curve extend to the bottom. It is very probable, however, that the decrease in velocity below .85D is more marked and would be better represented by a curve similar to that existing near the surface. The effect of a more rapid decrease in the bottom velocities would be to raise the threads of the mean velocities to nearer mid-depth.

The following table gives the ratio between the velocity at the surface V_o, the maximum velocity V_{max} and the velocity at .85D, V_{85D}:

	$\frac{V_m}{V_o}$	$\frac{V_o}{V_{max}}$	V_{85D}	$\frac{V_{85D}}{V_{max}}$
Low stage, mean curve	95	97	86	84
Medium stage, mean curve	93	99	85	83
High stage, mean curve	97	96	90	87
Wind down, mean stage	90	1.00	80	80
Wind up, mean curve	99	92	90	83
Grand mean curve	95	97	87	85

From the above table it appears that the greater the force of an up-stream wind the more the surface velocity differs from the maximum, and the nearer the surface and mean velocities approach equality; also that the velocity at .85D averages 85 per cent. of the maximum and 87 per cent. of the surface velocities.

The inclination to the vertical of the tangents in the mean curves increases with the gauge readings, being the least at low-water. The position of the thread of maximum velocity is dependent upon the force and direction of the wind. If the amount of its raising or lowering is assumed to be proportional to the force of the wind, its position in a calm* would be about .07D, and its rate about .018D per mile per hour of wind force.

i. e., A wind blowing down stream with a velocity equal to that of the current.

The marked regularities existing in single observations, especially at the high stage, can be seen in Fisg. 1, 2 and 3, Plate V. Fig. 1 represents observations Nos. 8 and 9; and Fig. 3, observation No. 34, when the river was about four feet above low-water taken at a stage about four feet below high-water; Fig. 2, the mean of the three observations of February 14, when the river was about four feet above low-water. These irregularities are doubtless due to pulsations of the river similar to those noted by J. Farrand Henry on the Saint Lawrence River.

In the observations of February 21, velocities exceeding five feet per second were found at three feet above the bottom, a fact which renders it extremely probable that the down-stream movement of sand waves is no measure of the amount of material being carried along the bottom, as the lighter portion of it must be swept over the crests without being deposited.

The effect of the lifting of the lower float, due to the action of the current upon the connecting wire, has not been considered. Professor Robinson, in his article* on this subject, states that if the floats are designed in accordance with certain results deduced from his formulæ, and if a fine wire is employed, this correction may be reduced to such an inconsiderable quantity as to be overlooked. The form of the floats and the size of the wire used both fulfilled these requirements.

Transverse velocity.—Owing to the pulsations of the river the surface velocity curves presented very great irregularities. To eliminate these as far as possible the nine observations taken near Fulton were combined by dividing the width of the river into ten equal parts and computing the mean depth and surface velocity at each point of division. These were then platted (see Fig. 3, Plate II), the velocity curve being shown revolved into the plan of the cross-section.

The result shown by the figure is that in the central portion of the river the surface velocity varies about as the depth; near the shores this relation fails, owing to the resistance of the banks.

The curve resulting from the single observation in the Fort Pillow Bend presented too may irregularities to show any definite relation.

Sediment.—The results of the sediment observations are represented graphically in Plate III, Fig. 2. The discharge is given in pounds per second, and has been obtained by multiplying the weight of water passing per second by the ratio by weight of sediment to water.

A comparison between the mean velocity† of the river and the discharge of sediment fails to show any relation between them. Thus the discharge of sediment on April 2, when the river was within 1.6 feet of high-water mark, was less than that passing on September 10, at a stage of 8 feet above low-water; and the discharge on the January rise was very much less than on the June–July rise. The reason of the failure of this relation is evidently due to the great difference in the purity of the waters of the Ohio and Missouri rivers. Thus the marked decrease in the sediment discharge on the March rise was due to the fact that this rise, being occasioned by the Ohio when the Mississippi above Cairo was very low, was composed of comparatively pure water. The decrease in the proportion of sediment to water in this case more than neutralized the increase in the volume of water. Again, the June–July rise out of the Missouri, occurring when the Ohio was low, was heavily burdened with sediment, and the maximum quantity of it was discharged at that time.

The following table shows the proportion of sediment to river water, the denominator of the fraction whose numerator is unity being given. The specific gravity of sediment has been taken as 1.9.

Proportion of sediment in river water—

	Water to sediment.	
	By weight.	By bulk.
Mean—January	1,266	2,405
Mean—February 1–26	1,428	2,713
Mean—April	1,205	2,290
Mean—May	1,234	2,334
Mean—June	1,000	1,900
Mean—July	581	1,054
Mean—August	1,075	2,042
Mean—September	1,232	1,436
Mean—Grand: January 1, February 26, March 30, October 8	1,061	2,016
Maximum—July 10	431	819
Minimum—April 2	3,704	7,037

* Van Nostrand's Engineering Magazine, April, 1875.

† The mean velocity curve is not shown in the diagram. It resembles the discharge curve so closely, however, that one can be taken for the other in making comparisons.

This table shows that with the exception of during the July rise the amount of sediment contained in a given volume of water remained nearly constant for all stages of the river.

The following table, derived from the results of the horizontal combinations, exhibits the mean distribution of sediment at surface, mid-depth, and bottom. The number of observations taken at low, medium, and high stage were 59, 64, and 55, respectively.

	Low stage.	Medium stage.	High stage.	Grand mean.
	Per cent.	*Per cent.*	*Per cent.*	*Per cent.*
Surface	22.7	28.4	30.6	27.5
Mid-depth	37.6	36.1	34.3	36.0
Bottom	39,7	35.5	35.1	36.5
	100.0	100.0	100.0	100.0

This table shows that the proportion of sediment transported at mid-depth and bottom is about equal at all stages, and that it is least at the surface; also that as the river rises the proportion found at the surface increases, while that at mid-depth and bottom correspondingly decreases. This latter fact may be explained by referring to the experiments of Mr. J. B. Francis, in which he proves that the water at the bottom finds its way to the surface, and considering that an action of this nature must be accelerated by irregularities on the river bed as sand waves. As has been shown, these latter are found at Fulton at medium and high stages, and their height is a maximum at the latter period.

In sixty-nine observations the amount of sediment found at the bottom exceeded that at mid-depth, while in 109 the reverse was the case. In only one instance was the amount found at the surface greater than either that at mid-depth or bottom, and this was probably due to the sample having been taken in a mud-boil, which, at certain stages, are quite frequent.

The horizontal distribution of the sediment is shown in the following table derived from the vertical combinations at the eight points of observation. (See Plate H, Fig. 5.)

Points of observation.	Per cent.	Points of observation.	Per cent.
Tennessee	.....	Point No. 15	13.25
Point No. 3	11.84	Point No. 18	13.14
Point No. 6	12.12	Point No. 21	12.60
Point No. 9	12.24	Point No. 24	12.16
Point No. 12	12.65		
		Ark	100.00

This table shows that the sediment is quite evenly distributed over the width of the river, and that the maximum amount is found in mid-stream. The fact that the amount obtained at points to the right of the center exceeds that at the corresponding points to the left, tends to show that the Mississippi and Ohio waters are not completely blended even at Fulton.

The monthly discharges of sediment, as far as observed, have been computed by Assistant W. M. Childs, and are given below. They have been obtained from the diagram in Plate III by the use of a planimeter. In forming this diagram only the results of the horizontal combinations have been used, and the assumption has been made that the mean of these combinations is the mean for the whole cross-section.

Monthly discharge of sediment at—

	Pounds per second.	Millions of pounds.
January	.....	123,8[illegible]
February 1–26	.....	71,798
March 30–31	.....	9,000
April	.....	93,226
May	.....	79,315
June	.....	75,125
July	.....	171,763
August	.....	35,410
September	.....	29,419
October 1–8	.....	7,776
Maximum discharge, July 10	119,723	.....
Maximum discharge, August 28	5,054	.....
Average discharge	32,256	.....
Total	.....	696,730

The total discharge given is for a period of 250 days; the yearly ratio would be 1,017,226 millions of pounds contributing one square mile of deposit 308 feet in depth.

The results of the observations are given in detail in Table 1, Appendix.

SLOPE OBSERVATIONS.

1—*At Fulton.*—The results of the slope observations are given in Table 4, Appendix. The "mean fall" is the average fall per 1,000 feet between the stakes mentioned; and the "rise or fall" is the change in gauge readings between 6 a. m. and 6 p. m., + indicating a rise, and — fall. On the left bank the mean slope has been taken between stakes Q and V as straight lines as *ab. ed.*, &c., Plate VI., joining these points coincide quite closely with the profiles, while those joining Q and Z fall below them.

All measurements are given in feet.

The investigation of this subject has led to the conclusions: First, that a longitudinal profile of the water surface near either bank is not a continuous plane, but is composed of a succession of small ones of varying inclinations. This is seen by an inspection of the results given in the above table, and also of Plate VI., where these results are graphically represented. Second, that longitudinal profiles of the water surface along opposite banks may bear no resemblance whatever to each other. This is also seen in Plate VI by a comparison of the profiles along the two banks. Generally a slight fall or a counter-slope along one bank is compensated by a steep fall along that portion of the other bank directly opposite. (Compare fall between WX and GH, and between 1J and Y2.) This fact shows that even when the channel is midstream there is liability to error in transferring levels across running water, on the assumption that points on the shores directly opposite each other have the same elevation. Third, that any mean velocity formula in which the slope obtained along the shore of the river enters as a factor, can only be considered as very approximate. For as the longitudinal profiles are a succession of planes, the mean slope between two points will be different for every variation in the distance between them; also the mean slope between two points on one bank may differ quite essentially from that between points directly opposite on the other bank. Thus, the fall along the left bank in Nos. 27 and 28 between points 1,000 feet above and below the discharge section was .207 and .227 foot, respectively, while at about the same stage the fall between the corresponding points on the opposite bank in Nos. 7, 17, and 18, was only .068, .120, and .124 foot, respectively. If the distance between the points is great, the mean slope may bear no relntion whatever to the local slope at the discharge section; and, on the other hand, if the distance is small, the full will be so small that the operation of measuring it will be extremely delicate.

As an example of the variations in the slope, the following table, giving its values between the upper stakes and those below it, are appended:

Mean fall per thousand feet. Between stakes.	No. 16.	No. 19.	No. 25.	No. 26.	No. 28.
AQ and BR	.0026	.0080	.0710	.0520	.0405
AQ and CS	.0450	.0590	.0395	.0265	.0312
AQ and DT	.0502	.0699	.0430	.0500	.0562
AQ and EU	.0622	.0598	.0471	.0593	.0724
AQ and FV	.0599	.0674	.0498	.0588	.0938
AQ and GW	.0665	.0617	.0534	.0699	.0944
AQ and HX	.0684	.0693	.0443	.0577	.0707
AQ and IY	.0741	.0755	.0476	.0598	.0726
AQ and JZ	.0683	.0717	.0634	.0753	.0941
AQ and K	.0646	.0672	.....	.....	.....

As examples of the errors arising from the use of mean velocity formulæ, Table 5, Appendix, is given. The value of the slopes used are the means given in a preceding table, the velocity at the upper and lower stakes mentioned being about equal. The mean depth has been taken equal to the mean radius, an assumption that can lead to no appreciable error. A + sign before an error indicates that the computed velocity is less than the observed velocity, and *vice versa*.

The notation and formulæ are as follows:

V = mean velocity in feet per second.

C = constant.

D = mean depth in feet.

S = surface fall in one foot.

Chezy's formula,

$$V = C\sqrt{DS}$$

Humphrey's and Abbot's formula,

$$V = ([225\,\tfrac{D}{2}\,S^{\frac{1}{2}}]^{\frac{1}{4}} - 0.0388)^2.$$

De Prony's formula with Weisbach coefficient—

$$V=(0.00024+.8675Ds)^{\frac{1}{2}}-0.015.$$

Hagen's formula,

$$V=4.39\sqrt{D^6}\sqrt{s}.$$

*Mean depth formula,

$$V=0.00262D^2.$$

It will be seen that the value of C in Chezy's formula is variable, being much greater for high than for low velocities. Its mean values for low, medium, and high stages are respectively, 100.4, 104.7, and 124.0. With but six exceptions its values exceed 100, the value assigned to it by Leslie, D'Aubisson, Downing, and others. The formulæ of Humphreys and Abbot, and of Hagen give good results for velocities of about 6 feet, but too great for lesser velocities, and too small for greater.

Several values of the constant N in Kutter's formula were computed and the results found to vary from 220 to 400. No test was made of the formula of D'Arcy and Bazin, as it was used by Kutter in deducing his formula.

As the slope observations at Fulton were taken over a portion of the river, in which no bends or marked variations in sectional area occurred, the broken profiles obtained must have been due to the irregularities of the bed along the shore. The most broken profiles were obtained at high-water as then these irregularities were greatest, owing to the slope of the banks not being uniform, and the current was swiftest. The eddy at Fulton (between W and X), which was very marked at high-water, was due to a projection of the shore line between stakes V and W.

The difficulty in obtaining a value for the slope must exist in all large rivers as the straight reach at Fulton is as favorable locality for the purpose as can be found. It is likely that if the slope could be measured along the axis of the stream, the profile obtained would approximate to a single plane, provided the sectional area was nearly constant.

In Plate VI the profiles along the same bank bear a marked resemblance to each other, a fact which leads to the belief that although the absolute value of the slope for any single observation may be uncertain, still a comparison of its values at different stages may be made. Such a comparison is made in Fig. 2, Plate III, in which the mean slopes given before have been platted to the gauge heights. The stage of the river at the time of the observations is shown in Fig. 3.

An inspection of Fig. 2 shows that the slopes along the left bank, which will be found below the broken line, lie very nearly on the line AB, showing that from the beginning of the June-July rise to the close of field work, the slopes varied directly as the gauge heights. No such relation, however, is found between the slopes along the right bank, a fact probably due to the December-January rise, being checked by the falls C, D, and E (Fig. 3), and the decline from the high-water of March by the rises H, I, and J. The effect of the former is to decrease, and of the latter to increase the slopes, their values at H being about 50 per cent. greater than at the same stage at E, and even equal to those found during the high-water stand in March. The slopes observed during the June-July rise exceed those found at the corresponding stage in January by about 60 per cent., and are greater than the slopes found at high water. In this last case, however, the comparison will be affected by the facts that the slopes were measured along opposite shores.

A summary of the conclusions shown by the comparison of the slopes are: First, that its value varies greatly for the same gauge-readings; second, that a series of small declines on the crest of a large rise greatly diminish its value; and, third, that a series of small rises on a general decline greatly augment its value. That an increase of slope occurs on a rising stage is not shown, the reverse frequently occurring.

1. *Between gauges.*—In Fig. 4, Plate III, is shown the falls between the gauges on the reach; the most noticeable feature shown, the great diversity in the values of the fall through Bullerton chute, between the gauges at Driver's and Tanza's Landings. This fall, at low-water, is 3.28 feet, or 1.15 feet per mile; while at high-water it is only about 0.7 foot, or 0.25 foot per mile. The relation between this fall and the gauge-readings at Driver's Landing is approximately expressed by the following equation, in which y = fall in feet and x = height above low-water:

$$y=3.28-0.08x+0.000615x^{\frac{5}{2}}$$

From the curve obtained from this equation it is seen that from near the low stage to a stage 25 feet above it, y varies almost directly as 25 feet $-x$; and that above the latter stage, it is sensibly constant.

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* This relation is not intended to be classed in the same category with the others of the list. It is not claimed to be general in its application, but merely to give fair results at this locality. It has the advantage of being independent of the slope.

The values of the observed and computed falls are given in the following table:

Fall through Bullerton chute.

No.	Date.	Height above low-water at Driver's Landing.	Rise or fall in twelve hours.	Observed fall.	Computed fall.	Error.
		Feet.	*Feet.*	*Feet.*	*Feet.*	*Feet.*
1	November 10	0.2	0.00	3.27	3.27	0.00
22	September 30	3.7	0.00	2.99	3.03	−0.04
20	August 28	3.7	+0.04	3.39	3.03	+0.36
21	September 25	3.8	−0.24	2.89	3.02	−0.13
19	August 7	7.1	−0.19	2.48	2.43	+0.05
18	August 5	7.9	−0.16	2.39	2.32	+0.05
17	July 31	10.4	−0.29	2.19	2.00	+0.19
14	June 18	12.3	−0.27	1.68	1.76	−0.08
13	June 17	12.7	−0.25	1.66	1.71	−0.05
9	June 5	14.1	+0.17	1.52	1.55	−0.03
10	June 7	14.5	−0.02	1.43	1.51	−0.08
12	June 10	14.8	−0.17	1.44	1.47	−0.03
11	June 9	14.9	+0.10	1.44	1.46	−0.02
15	July 5	18.3	+0.58	1.30	1.13	+0.17
8	April 26	21.5	−0.15	0.86	0.89	−0.03
16	July 10	22.8	+0.10	0.99	0.82	+0.17
2	January 9	24.3	0.00	0.70	0.75	−0.05
7	April 5	25.9	−0.50	0.76	0.71	+0.04
4	February 23	28.5	+0.24	0.72	0.68	+0.04
6	March 11	28.9	0.00	0.71	0.68	+0.03
5	March 8	29.0	−0.10	0.67	0.68	−0.01
3	January 20	29.1	−0.07	0.71	0.68	+0.03

In platting Fig. 3, Plate III, the computed fall has been used in all cases when the observations were taken at only one of the gauges.

The cause of the excessive slope off Bullerton towhead becomes evident from an inspection of Fig. 1, Plate III, where the mean and channel depths at low-water are represented.

It will be seen that the shoal in that locality acts as a dam, forming a pool above it and causing the steep slope below it. The minimum channel-depth was between cross-sections Nos. 4 and 5, Bullerton section, on the square crossing from Bullerton Bar to Bullerton towhead (see Plate I). At this point the depth obtained by steamboats varied from 5.5 to 6 feet. Notwithstanding the excessive slope, the mean velocity was only about 1.5 feet per second; the bulk of the fall being consumed in overcoming friction which, owing to the small depth, the presence of numerous bars, and the division of the river into three separate channels, was very great.

A pool similar to that existing off Plum Point is found, at low-water, below Fort Pillow. This is caused by the shoal at Island No. 34, a few miles below Fulton. The slope in this pool is almost *nil*, and the current very sluggish.

At high-water the river in the vicinity of Bullerton towhead affords, by its large sectional area, free passage to the water; and, consequently, has a very slight slope and a moderate velocity. Below Fort Pillow, however, the sectional area is very much reduced, and the river possesses both a high slope and velocity. (See Fig. 2, Plate VII.)

The fall between Nos. 18 and 25, Craighead Point, and Fulton, increases nearly as the gauge heights. At a stage about 17 feet above low-water the fall per mile becomes uniform between Driver's Landing and No. 28, Craighead Point.

In the table giving falls through Bullerton chute, the large value observed on August 28 was probably due to the fact that the river had been falling rapidly, and the channel across the bar, on the square crossing, had not scoured out. This theory is corroborated by the fact that several steamers grounded there about that date.

The distribution of the fall between the gauges (Figs. 1 and 2, Plate VII) was effected by means of Weisbach's formula, which, transposed and a term added to take into account the resistance due to bends, becomes $h_1 = Z\frac{lp}{F} - \frac{V^2}{2g} = h - \frac{V_1^2 - V_0^2}{2g}$ — height due to the resistance of bends, in which—

h=fall between two consecutive cross-sections, whose distance apart $=l$.

h_1=fall expended in overcoming the resistance of friction.

V_0 and V_1 are mean velocities at upper and lower cross-sections.

$V = \frac{1}{2}(V_0 + V_1)$.

p=mean wetted perimeter =(approximately) 1.01 mean width.

F=mean area of cross-section.

Z=coefficient of friction $=0.007409\ (1+\frac{0.1920}{V}.)$

g=32.2 feet.

From the observed fall between two consecutive gauges, the height due to resistance of bends, calculated by the Humphreys and Abbot formula, and the height due to the difference in velocity heads, were subtracted; the remainder, h_2, was the actual fall necessary to overcome the resistance of friction. The values of h_1 for the cross-sections between the gauges were then computed by the above formula, and h_2 divided by their sum. The quotient b gave the ratio between the actual coefficient of friction and Z.

Each value of h_1 was then multiplied by b, and the product, increased by the height due to difference in velocity heads, and that due to resistance of bends, taken as the required fall. The values obtained for b are given in the following table:

Ratio of actual coefficient of friction and Z.

Gauges,	Low-water, 1879.	Low-water, January 3, 1880.
Driver's Landing to Tanza's Landing	4.640	0.916
Tanza's Landing to No. 18 Craighead Point	3.455	0.910
No. 18, Craighead Point to Fulton	0.600	.....
No. 18, Craighead Point to No. 25, Craighead Point	.....	0.765
No. 25, Craighead Point to Fulton	.....	0.430

From this table it appears that except in the wide river at the low stage, the coefficient of friction is less than Z, a fact probably due to the yielding nature of the river bed. The value of Z was probably derived by Weisbach from experiments on canals and small rivers of stable regimen. In the wide river, at a high stage, the ratio b is nearly equal to unity; while at the low stage, owing to the great increase in frictional resistance, due to causes already mentioned, Z has to be increased nearly fivefold.

In calculating the values of h, it was found that at the stage of January 3, a fall of 0.99 foot, or at the rate of 2.2 feet per mile, was necessary to produce the great increase in velocity between cross-sections Nos. 25 and 26, Craighead section; also, that the expansion of the river below No. 26 required a slight counterslope. The observations made June 16, 1879, under direction of Major Suter, tend to verify these calculations. The fall then obtained between Fort Pillow and the head of the eddy, was 0.91 foot per mile, and a slight counterslope was found at the head of Fulton section. The stage of the river at that date was about 9 feet above low-water.

No slope observation was taken at low-water at No. 18 Craighead Point. At a stage 4.6 feet higher, the observed fall between that place and Fulton was 0.29 foot; the fall at low-water has been assumed as 0.22 foot.

The calculated fall between Driver's Landing and the various cross-sections below, and also the variation in sectional area, mean velocity, surface widths, and mean and channel depths over the reach, are shown in Table 6, Appendix.

DREDGING.

The following table exhibits the results of the dredging operations:

	Fulton.			Bullerton.			
			Mean.				*Mean.*
No. of observation	8	12	20	9	19	15	43
	Feet.	*Feet.*		*Feet.*	*Feet.*	*Feet.*	*Feet.*
Average depth	37	52	.....	14	20	25	.....
Average height above low-water.	8.1	17.0	.....	5	13-20	24-27	.....
	Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
Coarse gravel	0.6	2.7	1.9	6.5	0.3	0.9	1.8
Medium gravel	6.2	6.0	6.1	6.2	3.6	1.9	3.5
Fine gravel	3.3	4.2	3.9	2.9	3.2	1.6	2.6
Coarse sand	62.3	74.7	69.7	57.8	60.9	57.1	58.9
Fine sand	27.6	11.8	18.1	18.0	31.4	37.6	30.8
Lignite	.....	0.6	0.3	0.3	0.3	0.9	0.6
Clay	.....	.....	.....	.....	.....	.....	1.8
	100.0	100.0	100.0	100.0	100.0	100.0	100.0

It is probable that the finest sand was washed out of the dredge while it was being raised, as the diameter of that obtained was rarely less than .001 inch. The effect of this would be to increase the percentage of sand given above, and to decrease that of gravel, clay, and lignite.

The table shows that on the Bullerton section the greatest percentage of gravel and the least of sand are found at the low stage. On the Fulton section the reverse is the case; a greater percentage of sand and a less of gravel being found at the low than at the high stage. These results are probably due to the fact that at low-water the bed at Bullerton section was being deepened by the erosion of the high-water deposit, and that a greater proportion of the lighter sand had been carried away than the heavier gravel. On the Fulton section the greater specific gravity of the dredgings obtained at the high stage is probably due to the deposition of the heavy material eroded from the Fort Pillow bluffs.

The nature of the material deposited on the bed at the Fulton and Bullerton sections, derived from dredgings taken in it has already been given. (See Changes in the River-Bed.)

The following table, derived from the results obtained by the use of greased leads, shows approximately the extent of the distribution of the various materials over the river bed. The percentage of each was obtained by dividing the number of casts in which it was found by the total number of casts:

	Fulton.			Bullerton.		
Date	Nov. 13–14	Dec. 18–19	Mar. 26–31	Aug. 27	Feb. 5–10	April 1–5
Height above low-water	0.0 feet	16.0 feet	32.0 feet	4.5 feet	14.0 feet	27.0 feet
Number of sounding	372	306	330	470	1169	1196
	Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
Gravel	8	2	3	15	2	2
Sand	70	76	72	80	92	91
Mud	15	16	12	2	5	4
Clay	4	6	13	.....	.....	1
Lignite	3	.....	.....	3	1	2
	100	100	100	100	100	100

On the Fulton section the clay and mud were always found near the shores, the gravel and lignite in mid-stream, and the sand over the whole bed. The same distribution held good on the Bullerton section except that considerable mud was found in the stream, and that the distribution of the gravel was more general. Of 630 casts taken at the high stage in the main river off Bullerton Towhead all but 6 indicated sand and only 5 gravel. This tends to show that the heavier portion of the material carried in suspension past Plum Point was precipitated on the Bullerton section. Between Tanza's Landing and Fort Pillow the results obtained from the lead at high-water showed the presence of clay and mud near the Arkansas shore, and sand over the whole bed. Gravel was very rarely met with. Between Fort Pillow and the eddy, clay, gravel, and lignite were found near the bluff, and sand over Craighead bar.

The small percentage of clay obtained in the dredging is due to the fact that very few of them were taken near the shore.

The gravel obtained consists mainly of quartz; the varieties encountered were red and yellow jasper, agate, carnelian, flint, hornstone, sandstone, chert, and sard. The largest specimen was obtained on the Fulton section, and measured 2.5×1.5 inches. The sand obtained was comprised wholly of quartz. A very fine black sand was brought up several times by the greased lead. The clay was either of a grayish or bluish color, and occurred mostly in the form of nodules, which, when dried, became exceedingly hard.

Lignite was found in fragments, ranging as high as 3.5 inches in length; the largest specimens were almost always water-worn.

CAVING BANKS.

The amount of caving on the reach for the ten months ending October 1, was as follows:

Locality.	Volume.	Area.	Mean depth.	Mean width.	Maximum width.
1. Arkansas shore:	*Cubic feet.*	*Acres.*	*Feet.*	*Feet.*	*Feet.*
Bullerton section	998,000	2.6	8.6	16.3	44.0
No. 1–6 Craighead section	4,888,000	3.8	29.3	20.9	83.0
No. 9–15 Craighead section	5,761,000	3.7	36.2	16.4	49.0
No. 15–19 Craighead section	42,991,000	16.3	60.5	170.0	191.0
No. 19–25 Craighead section	13,879,000	17.4	17.1	143.0	321.0

Locality.	Volume.	Area.	Mean depth.	Mean width.	Maximum width.
1. Arkansas shore—Continued.	*Cubic feet.*	*Acres.*	*Feet.*	*Feet.*	*Feet.*
No. 3–8 Fulton section	1,253,000	1.2	24.1	13.0	60.0
Mean			35.6	77.5	
Sum	69,759,000	45.0			
2. Tennessee shore:					
Bullerton section	554,000	1.4	9.1	12.2	23.0
No. 1–6 Craighead section	1,645,000	0.9	40.5	25.2	29.0
No. 10–16 Craighead section	3,505,000	3.9	20.4	15.6	40.0
No. 25–26 Craighead section	83,000	0.1	23.0	7.2	12.0
Mean			20.9	15.5	
Sum	5,787,000	6.3			
OUTSIDE.					
3. Bullerton Towhead:					
Head to No. 5 Craighead section	2,387,000	2.0	26.5	11.5	31.0
No. 5 Craighead section to foot	16,356,000	6.7	55.9	86.3	262.0
INSIDE.					
Head to No. 2 Craighead section	1,369,000	1.1	28.5	15.7	26.0
No. 2–4 Craighead section	23,703.000	11.5	47.4	138.8	245.0
Mean			47.1	52.3	
Sum	43,815,000	21.3			

SUMMARY.

	Volume.	Area.	Mean depth.	Mean width.
	Cubic feet.	*Acres.*	*Feet.*	*Feet.*
Arkansas shore	69,759,000	45.0	35.6	38.9 51.3
Tennessee shore	5,787,000	6.3	20.9	5.0 15.3
Bullerton shore	43,815,000	21.3	47.1	41.7 52.3
Mean			38.0	23.0 42.7
Sum	119,361,000	72.6		

Caving has occurred only in the localities designated above. In the summary two values of the mean width have been given; the lower for that portion of the shore line on which the caving took place, and the upper for the entire length. The average increase in the width of the river between its bluff banks was about 40 feet, or at the rate of about 50 feet per year.

The caving on the Bullerton section occurred mainly at the high stage, and consisted in the wearing away of the upper portion of the bluff bank. The bulk of the caving on Bullerton towhead occurred at the low stage, on the outside near its foot, and on the inside at the point opposite Sans Souci. The annual rate of progress down stream of this caving has been 3,000 feet in the former and 2,000 feet in the latter locality. The boring made on the towhead, under direction of Major Suter, shows that, with the exception of a surface layer 5 feet in thickness, the bank for a depth of over 50 feet is composed of sand. The low-water channels, in which the current is usually very swift, impinging against this bank, causes the rapid erosion. The diminution of the area of the towhead, due to caving, has amounted to about 8 per cent. during the 10 months.

The caving on the Arkansas shore, in the vicinity of Sans Souci, is of long duration and of considerable extent, as is shown by the large gap in the levee between cross-sections Nos. 3 and 5, and by the disappearance of the cemetery near cross-section No. 4. The bank at this locality is composed of a clay layer, extending from the surface to about low-water mark, and a deep sand layer beneath. The caving measured here occurred mostly in the interval between the high water of January and March.

From the testimony of the inhabitants in the vicinity, the caving at and above Craighead Point has also been of long duration and of great extent. The caving of the bank above the Point will probably be increased by the wearing away of the foot of Bullerton towhead and the consequent impingement of the low-water channel against it. The boring made one mile below Tanza's Landing shows this bank to be composed of alternate layers of sand and clay. The caving in this locality occurred mostly

between the high waters of January and March. At Craighead Point the bluff bank was composed of fine sand, which, when reached by the river, melted very rapidly. This erosion occurred only at stages exceeding 22 feet above low water, as below that stage the bank was protected by Craighead Bar. As shown by the preceding tables, the width of caving was a maximum in this locality, but the mean depth was small.

The caving on the right bank of the Fulton section occurred mainly in the interval between the high waters of March and July. A portion of it was caused by the sweepage through the sand layers in the bank, of the water left at the high stage in an adjacent lake or slough.

The caving on the left bank of the Craighead section occurred mainly on the January rise. The banks at the localities where the erosion took place were composed of alternate sand and clay layers.

Of the total volume of caving, about 45 per cent. was due to local causes; *i. e.*, the attack of the high-water upon the bluff sand bank at Craighead Point, and of the low-water channels upon both sides of Bullerton towhead. Fifty per cent. occurred at stages exceeding 25 feet above low-water, when the average daily rate of caving was three times greater than for lower stages.

The intervals between the measurements were, in general, too long to determine satisfactorily whether the bulk of the caving occurs, as is generally supposed, on the decline after the flood.

SUMMARY.

1. Cross-section surveys:	
Ashport to Plum Point	No. 1
Bullerton section	No. 38
Craighead section	No. 5
Fulton section	No. 42
Number of miles of cross-section sounded	448.5
Number of soundings taken	45,779
Number of located soundings taken	43,694
Number of casts of greased lead	40,360
2. Longitudinal surveys:	
At Bullerton section	No. 33
At Fulton section	No. 35
Number of miles sounded	222.7
Number of soundings taken	188,253
Number of located soundings taken	7,503
3. Discharge observations:	
Number of observations taken	201
Number of soundings taken	16,723
Number of floats run	5,227
4. Vertical velocity observations:	
Number of observations taken	35
Number of soundings taken	105
Number of floats run	988
5. Transverse velocity observations:	
Number of observations	10
Number of soundings taken	286
Number of rods run	221
6. Sediment observations:	
Number of observations	178
Number of soundings taken	1,424
Number of samples taken	4,272
7. Miscellaneous:	
Number of dredgings taken	63
Number of slope observations at Fulton	38
Number of slope observations between gauges	263
Number of measurements at caving banks	595
Number of signals erected and located	75
Number of miles of levels run	15
Number of mats platted	99
Number of tracings made	92
Total number of soundings taken	252,570

Very respectfully, your obedient servant,

W. H. POWLESS,
Assistant Engineer.

SMITH S. LEACH,
First Lieutenant of Engineers,
Secretary Mississippi River Commission.

D 1.—Tabulated Results of Observations at Plum Point.

Table I.—*Current and sediment observations at Fulton, Tenn.*

Date.	Gauge.		Dimensions of cross-section.						Scour or fill.	Velocity, per second.		Discharge, per second.		Sediment, milligrams in 500 cubic centimeters.			
			Area.		Depth.			Width.									
	Above low-water.	Rise or fall in 24 hours.	Water.	Below datum.	Mean.	Mean datum.	Max.			Mean.	Max. mid-depth.	Water.	Sediment.	Surface.	Mid-depth.	Bottom.	Mean.
1879.	*Feet.*	*Feet.*	*Square feet.*	*Square feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Square feet.*	*Feet.*	*Feet.*	*Cubic feet.*	*Pounds.*				
Nov. 28	7.18	— 0.44	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10,453	283	203	474	320
29	6.80	— 0.46	84,712	102,918	34.6	40.8	43.5	2,450	.....	3.11	3.89	263,750	.....	.....	.....	.....	.....
30	6.61	— 0.19	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	7,700	206	196	320	240
Dec. 1	6.94	+ 0.34	83,397	101,060	34.0	40.1	42.0	2,454	+ 1,858	3.08	3.73	256,870	.....	.....	.....	.....	.....
2	7.31	+ 0.35	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	15,276	339	511	508	450
3	7.65	+ 0.32	82,110	97,986	33.3	38.9	42.5	2,469	+ 3,074	3.31	.....	271,610	.....	.....	.....	.....	.....
4	7.85	+ 0.28	86,655	102,066	35.2	40.5	43.0	2,465	— 4,080	3.37	4.15	292,600	9,507	235	241	297	260
6	8.16	+ 0.15	87,540	102,200	35.4	40.6	43.0	2,475	— 134	3.42	4.09	299,900	.....	.....	.....	.....	.....
8	8.95	+ 0.50	88,888	101,584	35.4	40.3	44.5	2,485	+ 613	3.59	4.50	319,603	.....	.....	.....	.....	.....
10	11.14	+ 1.25	94,914	102,054	37.9	40.5	47.0	2,501	— 470	4.15	5.50	393,471	.....	.....	.....	.....	.....
12	12.90	+ 1.04	99,630	102,397	39.6	40.6	48.5	2,514	— 339	4.79	6.66	478,099	.....	.....	.....	.....	.....
16	19.41	+ 1.33	117,945	103,891	46.1	41.2	56.0	2,556	— 1,494	5.70	7.33	671,860	.....	.....	.....	.....	.....
18	20.64	+ 0.45	120,420	103,184	47.0	40.9	58.0	2,561	+ 707	5.93	8.08	714,413	.....	.....	.....	.....	.....
19	20.89	+ 0.28	120,982	103,320	47.2	40.0	57.5	2,563	— 136	5.96	8.08	721,177	.....	.....	.....	.....	.....
22	20.22	— 0.53	117,855	101,638	46.0	40.3	54.5	2,562	+ 1,682	5.76	8.02	678,247	.....	.....	.....	.....	.....
26	18.62	+ 0.75	114,142	102,240	44.7	40.6	54.0	2,554	— 602	5.33	7.48	608,829	.....	.....	.....	.....	.....
28	21.23	+ 1.44	122,142	103,804	47.8	41.2	56.5	2,563	— 564	5.83	8.37	713,298	.....	.....	.....	.....	.....
31	25.20	+ 1.05	128,812	100,253	49.1	39.8	61.5	2,583	+ 3,549	6.43	9.30	827,680	.....	.....	.....	.....	.....
1880.																	
Jan. 1	25.76	+ 0.70	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	99,316	949	777	1,033	920
3	26.65	+ 0.40	138,240	105,838	53.7	42.0	65.0	2,578	— 5,613	6.90	10.08	954,451	.....	.....	.....	.....	.....
4	26.74	+ 0.07	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	61,390	454	535	576	520
6	26.33	— 0.34	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	41,328	266	364	478	370
8	25.57	— 0.35	133,177	103,314	51.7	41.0	68.0	2,576	+ 2,554	6.34	9.74	843,963	.....	.....	.....	.....	.....
9	25.32	— 0.27	132,851	103,716	51.5	41.2	67.0	2,578	— 402	6.10	9.10	810,044	33,906	302	373	331	335
10	25.80	+ 0.47	131,870	101,692	51.1	40.4	64.0	2,582	+ 2,024	6.51	8.77	859,115	41,610	320	467	372	385
13	28.07	+ 0.62	139,521	103,473	54.0	41.1	66.0	2,585	— 1,781	6.99	9.96	975,784	.....	.....	.....	.....	.....
14	28.69	+ 0.60	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	68,900	540	572	552	545
15	29.10	+ 0.43	141,570	102,872	54.6	40.8	67.0	2,592	+ 600	7.37	9.91	1,044,400	.....	.....	.....	.....	.....
16	29.50	+ 0.30	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	72,484	440	500	571	505
17	29.88	+ 0.48	142,140	101,365	54.8	40.2	67.0	2,595	+ 1,507	7.49	10.02	1,065,852	.....	.....	.....	.....	.....
19	30.08	+ 0.02	145,089	103,905	55.9	41.2	67.0	2,595	— 2,540	7.23	.....	1,049,304	49,187	306	356	461	380

	21	29.88	— 0.15	144,012	103,010	55.4	40.9	69.0	2,600	+ 895	7.13	9.43	1,026,508	32,683	254	259	256	255
	23	28.97	— 0.44	138,888	100,574	53.6	39.5	68.0	2,592	+ 2,436	7.14	8.71	992,277	32,642	182	338	280	265
	26	25.88	— 1.23	128,655	98,446	50.1	39.1	63.0	2,569	+ 2,123	6.32	8.40	807,210	20,077	166	198	227	195
	28	23.30	— 1.51	125,370	101,720	48 9	40.4	60.0	2,563	— 3,283	5.95	7.67	745,851	21,292	194	251	257	235
	31	19.21	— 1.37	114,795	101,547	45.0	40.3	56.5	2,552	+ 132	4.98	6.43	571,953	18,346	187	194	282	250
Feb.	2	16.88	— 1.02	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	16,808	197	280	304	260
	3	16.06	— 0.89	106,290	101,028	41.9	40.1	53.0	2,536	+ 519	4.59	6.03	488,810	.....	.....	.....	.....	.....
	4	15.17	— 0.85	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	12,767	181	229	226	215
	5	14.47	— 0.71	102,630	100,538	40.7	39.9	50.0	2,522	+ 490	4.41	5.42	452,569	.....	.....	.....	.....	.....
	7	13.42	— 0.40	96,559	97,943	38.4	38.9	50.0	2,514	+ 2,595	4.11	5.54	397,028	.....	.....	.....	.....	.....
	9	13.00	— 0.19	97,920	100,385	39.1	39.8	49.5	2,510	— 2,442	4.08	5.27	409,400	9,271	117	288	162	190
	11	12.29	— 0.35	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10,530	159	286	241	230
	12	12.12	— 0.30	93,740	98,961	37.4	39.3	48.0	2,506	+ 1,424	3.95	4.83	369,800	.....	.....	.....	.....	.....
	14	13.06	+ 0.80	96,960	99,276	38.6	39.5	50.0	2,513	— 315	4.07	5.14	394,811	.....	.....	.....	.....	.....
	16	19.51	+ 3.38	114,300	99,800	44.8	39.9	56.5	2,552	— 524	5.50	7.19	628,750	43,467	471	465	713	555
	18	24.83	+ 2.00	127,444	99,875	49.6	39.9	62.0	2,575	— 75	6.73	8.96	857,531	.....	.....	.....	.....	.....
	20	27.01	+ 1.00	134,010	100,783	51.9	40.3	64.0	2,581	— 908	7.09	10.06	951,155	67,666	556	583	574	570
	21	28.00	+ 0.90	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	86,488	688	685	732	705
	23	29.29	+ 0.64	139,792	100,629	53.5	40.3	67.0	2,595	+ 154	7.33	9.66	1,024,623	56,869	400	460	330	395
	25	30.18	+ 0.39	138,006	96,534	53.1	38.6	65.0	2,599	+ 4,095	7.50	10.77	1,035,446	.....	.....	.....	.....	.....
	26	30.43	+ 0.22	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	40,121	278	342	321	315
Mar.	1	30.85	— 0.03	136,323	93,162	52.4	37.3	69.0	2,599	+ 3,372	7.60	10.73	1,036,680	.....	.....	.....	.....	.....
	3	30.75	+ 0.02	139,770	96,856	53.8	38.8	69.0	2,597	— 3,694	7.58	9.37	1,060,266	.....	.....	.....	.....	.....
	5	30.58	— 0.09	141,165	98,669	54.3	39.5	69.0	2,600	— 1,813	7.39	9.50	1,044,050	.....	.....	.....	.....	.....
	8	30.18	— 0.10	135,300	93,858	52.7	37.5	68.0	2,599	+ 4,811	7.34	9.47	993,699	.....	.....	.....	.....	.....
	10	29.97	— 0.10	138,915	97,997	53.5	39.2	69.0	2,598	— 4,139	7.47	9.27	1,037,503	.....	.....	.....	.....	.....
	12	30.29	+ 0.29	136,380	94,626	52.4	37.9	68.0	2,600	+ 3,371	7.56	10.41	1,030,648	.....	.....	.....	.....	.....
	16	31.14	+ 0.29	137,475	93,545	52 9	37.4	69.0	2,600	+ 1,081	7.57	10.36	1,041,465	.....	.....	.....	.....	.....
	18	31.42	+ 0.15	140,040	95,324	53.7	38.1	70.0	2,608	— 1,779	7.91	10.05	1,107,891	.....	.....	.....	.....	.....
	20	31.73	+ 0.09	142,245	96,335	54.5	38.5	70.0	2,610	— 1,011	7.50	9.13	1,068,367	.....	.....	.....	.....	.....
	22	31.89	+ 0.11	142,350	96,071	54.6	38.4	70.0	2,607	+ 264	7.41	9.70	1,054,124	.....	.....	.....	.....	.....
	24	32.00	+ 0.07	144,270	97,644	54.2	39.1	70.0	2,612	— 573	7.75	9.71	1,117,425	.....	.....	.....	.....	.....
	26	32.03	0.00	143,520	96,843	54.9	38.7	69.0	2,612	+ 801	7.45	9.67	1,069,825	.....	.....	.....	.....	.....
	29	31.88	— 0.10	140,520	96,291	53.7	38.6	68.0	2,615	+ 552	7.74	9.39	1,087,520	.....	.....	.....	.....	.....
	30	31.69	— 0.20	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	19,707	116	151	171	145
	31	31.50	— 0.10	144,248	99,444	55.2	40.5	68.0	2,604	— 3,153	7.55	10.00	1,089,108	19,435	124	151	152	145
Apr.	2	30.44	— 0.65	140,340	97,932	54.0	39.2	68.0	2,597	+ 1,512	7.13	8.74	998,871	16,848	84	153	169	135
	3	29.83	— 0.62	138,358	96,009	53.4	38.4	66.0	2,595	+ 1,923	6.87	8.83	950,992	20,367	137	192	186	170
	5	27.60	— 1.05	132,642	97,637	51.3	39.1	64.0	2,584	— 1,628	6.41	8.35	850,100	22,156	178	230	212	205
	7	25.90	— 0.79	128,475	97,928	50.0	39.2	61.0	2,574	— 291	6.46	7.96	829,598	.....	.....	.....	.....	.....
	8	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	29,931	372	407	374	385
	9	25.27	— 0.28	123,156	94,039	47.4	37.6	62.0	2,598	+ 3,889	6.31	8.05	777,408	36,433	350	358	402	370
	10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	36,110	309	339	467	370
	11	24.96	— 0.05	125,487	97,148	48.2	38.5	61.0	2,602	— 3,109	6.42	7.85	805,811	.....	.....	.....	.....	.....
	12	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	25,697	226	289	267	265
	13	24.53	— 0.24	124,648	97,434	47.9	38.7	62.5	2,603	— 286	6.04	7.70	753,522	26,358	258	274	300	280
	15	24.06	— 0.30	124,425	98,409	47.8	39.0	61.0	2,601	— 975	6.17	8.01	767,470	.....	.....	.....	.....	.....
Apr.	16	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	480	539	570	530
	17	22.53	— 0.90	119,993	97,925	46.2	38.9	60.0	2,595	+ 484	5.67	7.19	680,432	53,888	612	687	622	635
	19	22.06	— 0.05	118,890	98,102	45.1	38.9	58.5	2,592	— 177	5.56	6.92	661,306	57,006	681	779	611	690
	21	22.38	+ 0.31	121,110	99,429	46.6	39.5	59.0	2,596	— 1,327	5.78	7.18	699,828	46,471	544	468	597	535
	23	23.13	+ 0.35	121,440	97,815	46.7	38.8	60.5	2,603	+ 1,614	5.93	7.44	722,100	50,389	496	580	611	565

TABLE 1.—*Current and sediment observations at Fulton, Tenn.*—Continued.

Date.	Gauge.		Dimensions of cross-section.						Scour or fill.	Velocity, per second.		Discharge, per second.		Sediment, milligrams in 500 cubic centimeters.			
			Area.		Depth.			Width.									
	Above low-water.	Rise or fall in 24 hours.	Water.	Below datum.	Mean.	Mean datum.	Max.			Mean.	Max. mid-depth.	Water.	Sediment.	Surface.	Mid-depth.	Bottom.	Mean.
1880.	*Feet.*	*Feet.*	*Square feet.*	*Square feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Square feet.*	*Feet.*	*Feet.*	*Cubic feet.*	*Pounds.*				
Apr. 24	23.30	+ 0.18	122,280	98,183	4.74	39.0	59.5	2,599	— 368	5.96	8.01	728,540	46,336	473	521	530	510
27	22.84	— 0.39	119,898	97,100	46.1	38.5	59.0	2,598	+ 1,083	5.84	7.11	701,279	36,796	401	441	419	420
29	21.85	— 0.37	119,898	99,635	46.2	39.5	60.0	2,596	— 2,535	5.56	6.95	666,869	29,178	342	353	347	350
May 1	22.74	+ 0.81	121,230	98,475	46.7	39.1	59.0	2,599	+ 1,160	6.08	7.54	737,214	.....	.....	.....	.....	.....
2	24.01	+ 1.08	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	41,265	324	397	402	375
3	24.94	+ 1.05	128,295	99,912	49.2	39.6	62.5	2,610	— 1,437	6.31	8.41	809,239	.....	.....	.....	.....	.....
4	25.64	+ 0.73	129,672	99,491	49.7	39.5	61.5	2,608	+ 421	6.56	8.72	850,774	53,508	973	1,018	1,010	1,010
6	26.50	+ 0.35	132,282	99,893	50.6	39.6	64.0	2,614	— 402	6.63	8.51	876,614	60,953	540	598	542	560
8	26.86	+ 0.12	133,470	100,124	51.0	39.7	64.0	2,618	— 231	6.70	7.96	894,830	38,492	312	385	347	350
10	26.50	— 0.35	132,705	100,291	50.7	39.8	63.0	2,618	— 167	6.57	8.37	871,651	35,460	246	428	315	330
11	25.90	— 0.60	131,430	100,452	50.2	39.9	62.5	2,616	— 161	6.26	7.55	822,763	28,003	232	266	307	270
12	24.92	— 0.95	130,698	102,224	50.0	40.6	62.5	2,612	— 1,772	6.13	7 48	801,240	26,917	222	267	311	270
13	23.62	— 0.29	128,115	103,215	49.2	41.0	63.0	2,606	— 991	5.89	7.67	754,663	35,853	392	328	380	380
14	22.40	— 1.28	124,488	102,816	47.8	40.8	60.0	2,606	+ 399	5.74	8.28	714,173	38,105	319	366	365	340
15	21.17	— 1.25	119,313	100,918	45.9	40.0	57.0	2,600	+ 1,898	5.31	6.46	633,376	38,592	310	403	432	388
May 17	18.51	— 1.35	111,300	99,688	43.2	39.6	55.0	2,578	+ 1,230	4.78	5.87	532,821	30,283	410	493	447	450
18	17.27	— 1.23	110,115	101,650	42.6	39.7	55.0	2,586	— 1,962	4.53	5.44	498,989	28,278	409	467	488	450
19	16.18	— 1.05	106,425	100,829	41.4	39.4	51.5	2,573	+ 821	4.34	5.14	462,227	24,059	338	452	474	420
20	15.21	— 0.98	102,600	99,422	40.0	38.8	52.5	2,566	+ 1,407	4.10	5.03	420,511	19,095	282	302	485	355
21	14.62	— 0.58	101,925	100,339	39.8	39.2	50.5	2,558	— 917	4.13	5.10	421,288	23,048	423	411	507	445
22	14.03	— 0.60	99,945	99,868	39.1	39.0	50.0	2,556	+ 471	3.90	4.86	389,300	16,305	263	344	365	325
24	13.73	— 0.01	98,802	99,441	38.6	38.8	48.0	2,557	+ 427	3.95	4.88	389,941	15,332	242	332	343	315
25	13.58	— 0.15	99,135	100,158	38.8	39 1	49.0	2,557	— 717	3.88	4.60	385,011	11,291	209	297	186	230
26	13.46	— 0.13	98,568	99,923	38.6	39.0	48.5	2,556	+ 235	3.84	4.84	378,350	13,480	203	322	319	280
27	13.23	— 0.22	98,190	100,108	38.4	39.1	48.5	2,555	— 185	3.76	4.95	369,318	12,664	227	294	308	277
28	13.05	— 0.18	96,498	98,876	37.8	38.6	49.0	2,554	+ 1,232	3.83	4.54	369,378	11,232	232	222	295	250
29	12.72	— 0.34	96,300	99,547	37.7	38.9	48.5	2,553	— 671	3.65	4.65	351,305	11,675	202	280	322	270
31	12.71	+ 0.10	95,940	99,159	37.6	38.7	49.5	2,553	+ 388	3.77	4.55	361,564	10,617	162	259	274	235
June 1	13.18	+ 0.52	97,335	99,302	38.9	38.8	48.5	2,553	— 143	3.90	4.63	379,719	13,244	222	281	340	280
2	13.92	+ 0.70	98,970	99,124	38.6	38.7	50.5	2,565	+ 178	4.03	4.97	399,283	12,825	210	279	290	260
3	14.68	+ 0.71	101,490	99,754	39.6	38.6	50.0	2,566	— 621	4.33	5.57	439,352	13,658	188	287	287	255
4	15.31	+ 0.63	102,807	98,899	40.0	39.0	51.5	2,571	+ 846	4.39	5.21	450,836	15,375	217	297	305	277
5	15.91	+ 0.45	106,150	101,165	41.2	39.5	54.0	2,579	— 2,266	4.35	5.72	462,129	16,935	240	323	316	295
7	16.26	+ 0.08	107,442	101,571	41.6	39.7	52.5	2,584	— 406	4.52	5.41	485,138	26,824	317	446	571	450
8	16.28	+ 0.01	108,450	102,502	42.0	40.0	52.5	2,584	— 931	4.66	5.67	504,260	26,547	374	458	474	435

	9	16.50	+ 0.22	107,532	100,821	41.6	39.4	54.0	2,584	+ 1,681	4.58	5.53	492,130	26,043	384	447	432	420
	10	16.39	— 0.17	107,310	101,027	41.1	39.5	53.0	2,584	— 206	4.53	5.56	486,638	24,665	308	515	384	400
	11	16.11	— 0.35	106,065	100,376	41.1	39.2	52.5	2,582	+ 651	4.49	5.48	476,227	28,514	405	519	517	480
	12	15.73	— 0.48	103,923	99,525	40.3	38.9	51.0	2,575	+ 851	4.37	5.30	454,526	32,935	524	631	593	585
	14	15.25	— 0.07	104,288	101,024	40.5	39.5	51.5	2,575	— 1,499	4.34	5.41	452,292	25,102	334	448	536	440
	15	15.25	— 0.01	103,300	100,036	40.1	39.1	52.0	2,575	+ 988	4.36	5.63	450,256	24,710	361	505	454	440
	16	15.02	— 0.25	102,393	99,778	39.8	39.0	51.5	2,572	+ 258	4.22	5.30	431,866	31,646	428	630	677	580
	17	14.58	— 0.44	103,570	101,953	40.0	39.8	50.5	2,567	— 2,175	4.22	4.95	437,175	32,696	483	707	663	620
	18	13.88	— 0.50	100,800	101,030	39.3	39.5	49.5	2,563	+ 922	4.04	5.02	407,276	31,724	592	626	648	620
	19	13.64	— 0.45	98,082	98,902	38.3	38.6	49.0	2,561	+ 2,129	4.04	4.93	397,139	29,900	473	576	765	605
	21	13.44	+ 0.14	98,190	99,574	38.3	38.9	50.0	2,561	— 672	4.08	4.98	400,860	30,480	395	546	507	485
	22	14.16	+ 0.54	102,195	101,707	37.8	39.7	50.0	2,568	— 2,133	4.19	5.05	428,363	31,297	415	516	509	480
	23	14.48	+ 0.54	102,930	101,621	40.1	39.7	51.0	2,569	+ 86	4.22	5.14	434,565	25,186	408	542	452	465
	24	15.06	+ 0.56	104,382	101,579	40.5	38.9	50.5	2,578	+ 42	4.35	5.22	453,671	19,110	371	419	526	440
	25	16.04	+ 0.77	106,360	101,030	41.2	39.5	51.5	2,584	+ 549	4.47	5.54	475,413	31,648	434	678	492	535
	26	16 61	+ 0.83	106,940	100,188	41.3	39.1	52.0	2,589	+ 842	4.74	5.72	507,314	36,410	545	510	684	580
	28	17.62	+ 0.48	111,105	101,717	42.8	39.7	54.0	2,593	— 1,529	4.86	5.89	540,006	53,378	764	802	822	795
	29	18.11	+ 0.47	111,660	101,927	43.4	39.8	55.0	2,594	— 210	4.93	6.37	550,136	52,072	690	805	783	760
	30	18.43	+ 0.25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	50,817	586	820	803	735
July	1	18.40	— 0.07	111,938	100,509	43.2	39.3	53.0	2,594	+ 1,418	4.96	6.18	554,725	65,564	866	975	1,005	950
	2	18.26	— 0.27	111,214	99,951	42.9	39.0	54.0	2,592	+ 558	4.86	.....	540,572	58,510	713	925	951	865
	3	18.12	— 0.08	110,360	99,657	42.6	38.9	52.5	2,593	+ 294	5.02	6.08	551,622	60,086	761	898	981	880
	5	19.20	+ 0.80	113,690	100,217	43.7	39.1	53.0	2,600	— 560	5.19	6.69	590,420	62,905	785	916	827	850
	6	20.88	+ 1.27	117.990	100,128	45.3	39.0	56.0	2,604	+ 89	5.76	7.41	679,262	69,711	700	923	871	830
	7	21.83	+ 1.31	123,550	97.638	47.4	38.1	56.5	2,606	+ 2,490	5.88	7.67	726,339	86,861	830	1,001	1,055	960
	8	22.73	+ 1.12	123,795	101,021	47.4	39.5	56.5	2,611	— 3,383	6.04	7.76	747,564	90,447	851	1,019	964	960
	9	23.76	+ 0.62	127,260	101,940	48 7	39.8	60.5	2,613	— 819	6.33	7.71	805,424	103,853	947	1,096	1,068	1,035
	10	23.94	+ 0.41	132,772	106,940	50.7	41.8	60.5	2,617	— 5,000	6.23	7.74	827,575	119,723	1,084	1,167	1,222	1,160
	12	23.96	— 0.11	126,090	100,206	48.2	39.1	59.5	2,617	+ 6,734	6.29	.....	792,600	103,137	940	988	1,011	980
	13	23.65	— 0.33	121,740	96,799	46.5	37.8	56.5	2,616	+ 3,402	6.17	7.70	751,738	77,792	706	890	887	830
	14	23.15	— 0.52	120,083	96,377	45.9	37.6	56.0	2,611	+ 422	5.96	7.87	715,348	73,648	763	852	876	830
	15	22.64	— 0.54	118,800	97,731	45.4	38.2	57.0	2,615	— 1,354	5.98	7.60	710,501	81,492	775	746	729	755
	16	21.85	— 0.73	117,990	97,764	45.3	38.2	56.0	2,607	— 33	5.64	7.09	665,515	70,437	816	853	884	850
	17	21.20	— 0.65	115,560	96,929	44.4	37.9	56.0	2,602	+ 835	5.51	6.89	636,731	69,779	928	753	941	870
	19	19.66	— 0.74	113,625	98,913	43.8	38.6	54.0	2,597	— 1,984	5.18	6.26	588,681	67,648	847	969	962	925
	20	18.92	— 0.75	111,285	98,493	42.9	38.5	53.5	2,593	+ 420	5.08	6.25	565,198	65,345	910	954	944	935
	21	18.02	— 0.88	108,540	98,137	41.8	38.3	52.0	2,594	— 644	4.90	6.32	532,318	61,082	814	971	974	920
	22	17.30	— 0.75	105,660	95,985	40.8	37.5	52.5	2,589	+ 2,152	4.78	5.86	504,533	55,146	756	936	941	880
	23	16.50	— 0.80	103,680	97,178	40.1	38.0	50.0	2,585	— 1,193	4.62	5.54	479,263	44,535	749	887	582	740
	24	15.71	— 0.77	102,240	97,804	39.4	38.2	50.0	2,572	— 626	4.51	5.42	460,883	33,415	557	664	364	565
	26	14.40	— 0.57	99,180	98,106	38.8	38.3	49.0	2,556	— 302	4.09	5.01	405,828	40,226	457	1,028	895	790
	27	13.84	— 0.55	96,795	97,127	37.8	37.9	47.0	2,557	+ 979	4.07	5.17	394,138	37,521	612	844	849	765
	28	13.41	— 0.45	96,060	97,541	37.6	38.1	48.0	2,553	— 414	3.89	4.83	373,360	31,454	647	800	559	670
	29	13.04	— 0.36	96,480	98,879	37.8	38.6	47.0	2,549	— 1,338	3.96	4.94	381,914	32,290	542	786	801	705
	30	12.58	— 0.46	98,460	102,133	38.7	39.9	48.0	2,546	— 3,254	3.79	4.59	373,048	31,766	553	818	777	715
	31	12.08	— 0.50	94,995	99,838	37.4	39.3	46.5	2,542	+ 2,295	3.59	4.40	341,397	35,961	763	862	908	845
Aug.	2	10.81	— 0.56	91,980	100,022	36.3	39.1	45.0	2,534	— 184	3.37	4.12	309,631	29,091	639	869	900	810
	3	10.38	— 0.49	90,225	99,434	35.6	38.8	45.0	2,533	+ 583	3.38	4.30	305,205	24,229	450	812	656	645
	4	9.81	— 0.53	89,370	99,970	34.9	39.0	44.0	2,529	— 536	3.32	3.91	296,667	15,401	524	389	710	430
	5	9.46	— 0.37	86,823	98,324	34.4	38.4	43.5	2,524	+ 1,641	3.14	4.02	272,631	21,793	427	785	675	630
	6	9.08	— 0.25	84,870	97,332	33.6	38.0	43.5	2,521	+ 997	3.05	3.68	258,566	19,381	428	668	691	595
	7	8.70	— 0.41	84,870	98,265	33.7	38.4	44.0	2,519	— 993	3.03	3.68	257,497	16,577	388	503	688	525

TABLE I.—*Current and sediment observations at Fulton, Tenn.*—Continued.

Date.	Gauge.		Dimensions of cross-section.						Scour or fill.	Velocity, per second.		Discharge, per second.		Sediment, milligrams in 500 cubic centimeters.			
			Area.		Depth.			Width.									
	Above low-water.	Rise or fall in 24 hours.	Water.	Below datum.	Mean.	Mean datum.	Max.			Mean.	Max. mid-depth.	Water.	Sediment.	Surface.	Mid-depth.	Bottom.	Mean.
1880.	*Feet.*	*Feet.*	*Square feet.*	*Square feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Square feet.*	*Feet.*	*Feet.*	*Cubic feet.*	*Pounds.*				
Aug. 9	8.10	— 0.26	83,970	98,858	33.5	38.6	43.5	2,508	— 593	2.90	3.65	243,245	14,738	245	593	600	490
10	7.86	— 0.25	82,578	98,109	32.9	38.3	42.0	2,505	+ 749	2.82	3.41	232,884	15,837	324	688	621	545
11	7.69	— 0.17	82,035	97,949	32.8	38.3	43.0	2,504	+ 160	2.72	3.38	223,540	14,703	351	581	589	500
12	7.52	— 0.17	82,260	98,515	32.9	38.5	42.0	2,501	— 566	2.82	3.44	232,235	11,574	237	523	495	400
13	7.36	— 0.17	81,630	98,340	32.7	38.4	41.0	2,500	+ 175	2.78	3.40	226,663	13,315	231	590	597	470
14	7.26	— 0.12	81,810	98,791	32.7	38.6	42.5	2,499	— 451	2.76	3.23	226,094	14,321	288	618	619	570
16	7.15	— 0.04	81,630	98,206	32.7	38.4	41.0	2,498	+ 585	2.68	3.27	218,784	14,140	307	598	653	520
17	7.09	— 0.07	80,680	98,109	32.3	38.3	41.5	2,498	+ 97	2.71	3.27	218,907	11,591	245	610	435	430
18	6.91	— 0.17	80,460	98,312	32.3	38.4	41.0	2,495	— 203	2.66	3.24	213,903	11,925	327	498	533	455
19	6.70	— 0.19	79,785	98,160	32.0	38.3	41.0	2,493	+ 152	2.53	3.08	201,842	10,155	270	447	471	395
20	6.48	— 0.23	79,695	98,617	32.0	38.5	40.5	2,491	— 457	2.50	2.98	199,264	8,403	218	399	397	340
21	6.27	— 0.22	78,255	98,103	31.1	38.3	41.0	2,484	+ 514	2.52	3.03	197,613	9,834	242	465	497	405
23	5.82	— 0.26	76,343	96,874	30.9	37.8	39.0	2,477	+ 1,229	2.45	2.95	186,724	8,517	192	417	484	390
24	5.58	— 0.33	76,270	97,413	30.9	38.0	38.5	2,473	— 539	2.36	2.76	179,652	7,495	156	398	436	330
25	5.18	— 0.40	75,690	97,796	30.7	38.2	40.0	2,468	— 383	2.35	2.80	178,147	6,998	146	379	425	315
26	4.90	— 0.29	74,160	96,812	30.1	38.7	40.0	2,464	+ 984	2.26	2.67	167,806	6,395	179	369	368	305
27	4.64	— 0.25	72,940	96,409	29.6	37.7	39.5	2,465	+ 403	2.20	2.60	160,645	5,156	155	357	338	255
28	4.56	— 0.08	72,855	96,499	29.5	37.7	39.0	2,465	— 90	2.22	2.70	161,424	5,054	147	295	308	250
30	5.30	+ 0.45	75,460	97,256	30.6	38.0	39.0	2,472	— 757	2.37	2.85	178,606	6,296	150	348	368	285
31	5.63	+ 0.38	76,275	96,958	30.8	37.9	39.0	2,478	+ 298	2.49	2.96	190,433	6,047	174	290	296	255
Sept. 1	5.94	+ 0.32	78,430	98,867	31.6	38.6	41.0	2,484	— 1,909	2.59	3.18	202,845	.....	.....	.....	.....	.....
2	6.36	+ 0.47	78,705	97,185	31.6	37.9	41.0	2,488	+ 1,682	2.58	3.27	202,989	7,076	195	327	288	270
3	6.68	+ 0.45	77,810	96,257	31.1	37.6	41.0	2,500	+ 928	2.68	3.29	208,873	7,413	217	304	284	270
4	6.88	+ 0.15	79,605	97,563	31.8	38.1	40.5	2,501	— 1,306	2.76	3.27	220,064	7,926	181	325	346	290
6	7.00	+ 0.11	80,415	98,118	32.1	38.3	42.5	2,502	— 555	2.83	3.37	227,692	10,482	258	417	435	370
7	7.45	+ 0.42	80,843	97,490	32.3	38.1	42.0	2,504	+ 628	2.98	3.64	240,757	11,580	198	452	516	388
8	7.82	+ 0.45	84,400	100,022	33.6	38.7	43.0	2,509	— 2,532	3.13	3.68	264,214	14,606	319	530	499	450
9	7.98	+ 0.17	83,770	98,886	33.4	38.6	43.5	2,508	+ 1,136	3.02	3.58	252,447	14,624	360	537	511	470
10	7.99	+ 0.01	83,090	98,276	33.1	38.4	43.0	2,508	+ 610	3.01	3.66	249,793	19,577	526	665	704	630
11	8.05	+ 0.06	84,440	99,424	33.6	38.8	43.0	2,508	— 1,148	3.03	3.57	256,039	17,752	374	640	668	560
13	8.62	+ 0.23	85,815	99,439	34.1	38.8	43.0	2,520	— 15	3.20	3.89	274,778	18,161	415	629	562	535
14	8.77	+ 0.15	85,790	99,038	34.0	38.7	43.0	2,520	+ 40	3.15	3.70	270,065	17,016	409	588	515	505
15	8.45	— 0.33	84,555	98,599	33.6	38.5	43.0	2,516	+ 439	3.09	3.90	260,867	16,938	352	591	616	525
16	8.08	— 0.46	83,740	98,710	33.3	38.6	43.0	2,510	— 111	3.02	3.66	252,735	14,295	346	534	516	460
17	7.53	— 0.55	81,045	97,359	32.4	38.0	42.0	2,502	+ 1,351	2.87	3.57	232,719	13,433	389	493	491	460

	18	6.91	— 0.55	80,590	98,467	32.3	38.5	41.5	2,495	— 1,108	2.70	3.39	217,657	11,616	317	479	488	430
	20	5.97	— 0.43	77,940	98,134	31.4	38.3	41.5	2,481	+ 333	2.55	3.20	199,065	10,679	382	437	473	430
	21	5.65	— 0.32	76,365	97,315	30.9	38.0	40.5	2,474	+ 819	2.52	3.16	192,549	9,684	339	405	450	400
	22	5.43	— 0.22	77,290	98,860	31.3	38.6	41.0	2,473	— 1,495	2.51	3.20	194,039	9,789	295	467	492	420
	23	5.25	— 0.18	76,500	98,430	31.0	38.5	40.0	2,469	+ 380	2.46	3.05	188,122	9,135	261	465	479	400
	24	5.04	— 0.22	75,105	97,478	30.4	38.1	40.0	2,467	+ 952	2.35	2.89	170,885	9,057	297	462	468	410
	26	4.56	— 0.26	73,870	97,505	30.0	38.1	39.5	2,462	— 27	2.25	2.78	166,541	7,653	223	415	454	365
	27	4.39	— 0.27	73,510	97,571	29.9	38.1	39.5	2,462	— 66	2.34	2.83	171,824	7,516	299	365	430	365
	28	4.25	— 0.10	72,630	97,023	29.6	38.0	39.5	2,459	+ 548	2.16	2.63	156,923	7,018	246	373	425	350
	29	4.17	— 0.05	73,080	97,654	29.7	38.1	39.0	2,455	— 631	2.25	2.73	164,389	6,945	186	434	436	350
Oct.	1	4.15	0.00	72,380	97,005	29.4	37.9	38.5	2,455	+ 649	2.13	2.60	154,198	6,350	203	432	328	320
	2	4.15	0.00	72,790	98,415	29.6	38.4	39.5	2,455	— 1,410	2.14	2.68	155,697	5,591	177	319	333	277
	4	4.16	0.00	73,890	98,534	30.1	38.5	39.0	2,458	— 119	2.38	3.11	175,877	6,846	208	380	413	340
	5	4.45	+ 0.26	73,665	97,566	29.9	38.1	39.5	2,461	+ 968	2.30	2.77	169,650	6,509	190	303	409	300
	7	4.85	+ 0.25	74,830	97,737	30.4	38.2	40.0	2,463	— 171	2.37	2.94	177,030	6,852	200	368	356	305
	8	4.99	+ 0.15	74,610	97,141	30.3	37.9	40.0	2,463	+ 596	2.43	2.86	181,045	8,312	240	401	437	360
	9	5.07	+ 0.06	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10,851	280	555	579	470
	12	4.81	— 0.12	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	7,664	223	348	471	350

TABLE No. 2.—*Differences between observed and computed points on the mean vertical velocity curves.*

No. 1.—MEAN CURVE FOR LOW STAGE.

(Fig. 4, Plate V.)

Number of observations		9
Mean height of surface above low-water	feet	6.0
Mean depth of water	do	33.1
Mean direction and force of wind (miles per hour), up		2.8

Depth.	Observed velocity.	Computed velocity.	Difference.	Depth.	Observed velocity.	Computed velocity.	Difference.
Surface	2.705	2.679	—.026	.55 D	2.550	2.524	—.026
.033 D	2.707	2.714	+.007	.60 D	2.514	2.488	—.026
.067 D	2.738	2.737	—.001	.65 D	2.475	2.452	—.023
.10 D	2.740	2.755	+.015	.70 D	2.408	2.416	+.008
.15 D	2.758	2.769	+.011	.75 D	2.448	2.380	—.068
.20 D	2.735	2.767	+.032	.80 D	2.337	2.344	+.007
.25 D	2.762	2.748	—.014	.85 D	2.272	2.308	+.036
.30 D	2.717	2.704	—.013	.90 D	2.264	2.272	+.008
.35 D	2.720	2.668	—.052	Bottom	.....	2.200	.....
.40 D	2.660	2.632	—.028				
.45 D	2.591	2.596	+.005	Sum	.....	.....	.455
.50 D	2.511	2.560	+.049	Mean	.....	.....	.022

No. 2.—MEAN CURVE FOR MEDIUM STAGE.

(Fig. 5, Plate V.)

Number of observations		17
Mean height of surface above low-water	feet	15.0
Mean depth of water	do	49.0
Mean direction and force of wind, up		1.6

Depth.	Observed velocity.	Computed velocity.	Difference.	Depth.	Observed velocity.	Computed velocity.	Difference.
Surface	4.329	4.304	+.025	.55 D	3.871	3.989	—.118
.033 D	4.313	4.337	—.024	.60 D	3.872	3.931	—.059
.067 D	4.383	4.355	+.028	.65 D	3.984	3.873	+.111
.10 D	4.448	4.369	+.079	.70 D	3.838	3.815	+.023
.15 D	4.378	4.372	+.006	.75 D	3.873	3.757	+.116
.20 D	4 332	4.363	—.031	.80 D	3.646	3.699	—.053
.25 D	4.333	4.333	.000	.85 D	3.641	3.641	.000
.30 D	4.261	4.279	—.018	.90 D	.....	3.583	.....
.35 D	4.242	4.221	+.021	Bottom	.....	3.467	.....
.40 D	4.089	4.163	—.074				
.45 D	4.118	4.105	+.013	Sum	.....	.....	.800
.50 D	4.048	4.047	+.001	Mean	.....	.....	.042

No. 3.—MEAN CURVE ON HIGH-WATER STAGE.

(Fig. 6, Plate V.)

Number of observations		8
Mean height of surface above low-water	feet	25.1
Mean depth of water	do	55.8
Mean direction and force of wind, up		5.0

Depth.	Observed velocity.	Computed velocity.	Difference.	Depth.	Observed velocity.	Computed velocity.	Difference.
Surface	5.358	5.530	—.172	.55 D	5.460	5.321	+.139
.033 D	5.698	5.665	+.033	.60 D	5.426	5.263	+.163
.007 D	5.615	5.709	—.094	.65 D	5.115	5.205	—.090
.10 D	5.819	5.731	+.088	.70 D	5.135	5.147	—.012
.15 D	5.743	5.740	+.003	.75 D	5.172	5.089	+.083
.20 D	5.810	5.720	+.090	.80 D	4.895	5.031	—.136
.25 D	5.434	5.668	—.234	.85 D	5.021	4.974	—.047
.30 D	5.613	5.610	+.003	.90 D	.....	4.916	.....
.35 D	5.585	5.552	+.033	Bottom	.....	4.800	.....
.40 D	5.413	5.494	—.081				
.45 D	5.493	5.436	+.057	Sum	.....	.....	1.679
.50 D	5.357	5.378	—.021	Mean	.....	.....	.088

TABLE No. 2.—*Differences between observed and computed points, &c.*—Continued.

NO. 4.—MEAN CURVE FOR DOWN-STREAM WINDS.

(Fig. 7, Plate V.)

Number of observations 6
Mean height of surface above low-water ..... feet.. 11.6
Mean depth of water ..... do... 36.3
Mean force of wind 4.2

Depth.	Observed velocity.	Computed velocity.	Difference.	Depth.	Observed velocity.	Computed velocity.	Difference.
Surface	4.078	3.730	—.348	.55 D	3.293	3.397	+.104
.033 D	3.788	3.729	—.059	.60 D	3.287	3.334	+.047
.067 D	3.732	3.725	—.006	.65 D	3.433	3.266	—.167
.10 D	3.717	3.719	+.002	.70 D	3.243	3.191	—.052
.15 D	3.707	3.705	—.002	.75 D	3.133	3.112	—.021
.20 D	3.630	3.686	+.056	.80 D	2.980	3.026	+.046
.25 D	3.773	3.662	—.111	.85 D	2.953	2.935	—.018
.30 D	3.602	3.631	+.029	.90 D	.....	2.839	.....
.35 D	3.585	3.596	+.011	Bottom	.....	2.630	.....
.40 D	3.588	3.554	—.034				
.45 D	3.502	3.508	+.006	Sum	.....	.....	1.209
.50 D	3.365	3.455	+.090	Mean	.....	.....	.063

NO. 5.—MEAN CURVE FOR UP-STREAM WINDS.

(Fig. 8, Plate V.)

Number of observations 24
Mean height of surface above low-water ..... feet.. 16.0
Mean depth of water ..... do... 48.4
Mean force of wind 4.9

Depth.	Observed velocity.	Computed velocity.	Difference.	Depth.	Observed velocity.	Computed velocity.	Difference.
Surface	4.127	4.122	—.005	.55 D	4.062	4.067	+.005
.033 D	4.322	4.300	—.022	.60 D	4.062	4.010	—.052
.067 D	4.363	4.396	+.033	.65 D	3.951	3.953	+.002
.10 D	4.489	4.451	—.038	.70 D	3.898	3.895	—.003
.15 D	4.438	4.482	+.044	.75 D	3.981	3.838	—.143
.20 D	4.469	4.470	+.001	.80 D	3.779	3.780	+.001
.25 D	4.288	4.412	+.124	.85 D	3.787	3.723	—.064
.30 D	4.342	4.355	+.013	.90 D	.....	3.665	.....
.35 D	4.334	4.298	—.036	Bottom	.....	3.550	.....
.40 D	4.198	4.240	+.042				
.45 D	4.165	4.182	+.017	Sum	.....	.....	0.678
.50 D	4.092	4.125	+.033	Mean	.....	.....	0.035

NO. 6.—GRAND MEAN CURVE.

(Fig. 9, Plate V.)

Number of observations 34
Mean height of surface above low-water ..... feet.. 14.9
Mean depth of water ..... do... 46.3
Mean direction and force of wind, up 2.7

Depth.	Observed velocity.	Computed velocity.	Difference.	Depth.	Observed velocity.	Computed velocity.	Difference.
Surface	4.135	4.154	+.019	.55 D	3.898	3.912	+.014
.033 D	4.214	4.211	—.003	.60 D	3.878	3.864	—.014
.067 D	4.237	4.251	+.014	.65 D	3.850	3.816	—.034
.10 D	4.319	4.273	—.046	.70 D	3.765	3.767	+.002
.15 D	4.274	4.277	+.003	.75 D	8.802	3.719	—.083
.20 D	4.256	4.252	—.004	.80 D	3.591	3.670	+.081
.25 D	4.177	4.203	+.026	.85 D	3.617	3.621	+.004
.30 D	4.170	4.155	—.015	.90 D	.....	3.573	.....
.35 D	4.156	4.107	—.049	Bottom	.....	3.476	.....
.40 D	4.022	4.058	+.036				
.45 D	4.037	4.010	—.027	Sum	.....	.....	0.486
.50 D	3.949	3.961	+.012	Mean	.....	.....	0.025

TABLE NO. 3.—*Measurements of velocities in vertical planes.*

NO. 1.—TAKEN DECEMBER 23, 1879.

Distance out from left base ..... feet.... 625
Height of surface above low-water ..... do.... 19.5
Depth of water ..... do.... 54.5
Direction and force of wind, up 5.4

Depth.	Velocity.	Depth.	Velocity.	Depth.	Velocity.	Depth.	Velocity.
0	4.72	12	5.26	24	5.23	36	4.47
2	5.50	14	5.75	26	4.92	38	.....
4	5.75	16	5.21	28	.....	40	4.86
6	5.58	18	5.63	30	4.72	42	.....
8	5.52	20	5.98	32	4.70	44	4.52
10	5.32	22	4.77	34	5.05	46	4.52

NO. 2.—TAKEN JANUARY 24, 1880.

Distance out from left base ..... feet.... 320
Height of surface above low-water ..... do.... 28.3
Depth of water ..... do.... 62.5
Direction and force of wind, up 5.1

Depth.	Velocity.	Depth.	Velocity.	Depth.	Velocity.	Depth.	Velocity.
0	6.33	15	5.89	30	5.95	45	5.02
3	6.67	18	6.35	33	6.27	48	5.41
6	5.29	21	6.02	36	5.43	.....	.....
9	6.50	24	6.41	39	6.37	.....	.....
12	6.53	27	5.58	42	5.78	.....	.....

NOS. 3 AND 4.—TAKEN FEBRUARY 4, 1880.

Distance out from left base ..... feet.... 450
Height of surface above low-water ..... do.... 15.0
Depth of water ..... do.... 52.0
Direction and force of wind, up 5.8

Depth.	Velocity, first observation.	Velocity, second observation.	Velocity, mean.	Depth.	Velocity, first observation.	Velocity, second observation.	Velocity, mean.
0	4.35	3.83	4.09	24	4.10	4.41	4.25
2	4.35	4.59	4.47	26	4.33	4.03	4.18
4	4.24	4.36	4.30	28	3.92	3.85	3.88
6	4.54	4.59	4.56	30	3.97	3.47	3.72
8	4.58	4.78	4.68	32	3.89	4.22	4.06
10	4.58	4.26	4.42	34	3.64	3.82	3.73
12	4.45	5.00	4.72	36	3.97	3.63	3.80
14	4.40	4.59	4.49	38	3.99	3.95	3.97
16	3.92	4.50	4.21	40	3.97	3.78	3.88
18	4.53	4.40	4.47	42	3.97	3.82	3.90
20	4.21	4.08	4.15	44	4.00	3.83	3.91
22	4.20	4.08	4.14	46	3.32	3.65	3.48

TABLE No. 3.—*Measurements of velocities in vertical planes*—Continued.

NOS. 5, 6, AND 7.—TAKEN FEBRUARY 14, 1880.

Distance out from left base	feet	490
Height of surface above low-water	do	13.2
Depth of water	do	49.5
Direction and force of wind, up		1.

Depth.	Velocity, first observation.	Velocity, second observation.	Velocity, third observation.	Velocity, mean.	Depth.	Velocity, first observation.	Velocity, second observation.	Velocity, third observation.	Velocity, mean.
0	4.69	4.45	4.37	4.50	24	4.39	3.85	4.02	4.09
2	4.10	3.98	3.39	3.82	26	4.03	3.67	4.10	3.93
4	4.33	4.31	4.21	4.28	28	4.27	3.22	3.82	3.77
6	4.57	3.96	4.48	4.34	30	4.05	4.13	4.48	3.22
8	4.43	4.16	4.44	4.34	32	3.97	4.63	3.88	4.16
10	4.59	4.67	4.55	4.60	34	3.75	3.68	3.99	3.81
12	3.95	4.23	3.94	4.04	36	4.40	4.65	4.13	4.39
14	4.50	4.42	4.08	4.33	38	4.10	4.18	4.41	4.23
16	4.20	3.88	4.54	4.21	40	3.58	3.69	.....	3.63
18	4.63	4.30	4.35	4.43	42	4.63	4.03	3.58	4.08
20	4.00	3.91	4.19	4.03	44	3.80	4.40	3.35	3.85
22	4.25	3.32	4.39	3.98	.....	.....	.....	.....	.....

NOS. 8 AND 9.—TAKEN FEBRUARY 21, 1880.

Distance out from left base	feet	265
Height of surface above low-water	do	28.1
Depth of water	do	51.0
Mean velocity in vertical plane	do	5.901
Ratio of mean to mid-depth velocity	do	1.015
Direction and force of wind, up		1.8

Depth.	Velocity first observation.	Velocity second observation.	Velocity, mean.	Depth.	Velocity, first observation.	Velocity, second observation.	Velocity, mean.
0	5.98	5.27	5.63	26	5.56	6.06	5.81
2	5.99	6.06	6.03	28	5.68	6.99	6.33
4	6.06	6.54	6.30	30	6.45	5.91	6.18
6	6.55	6 00	6.27	32	5.99	4.97	5.48
8	6.62	5.56	6.09	34	5.43	5.62	5.52
10	6.06	6.90	6.48	36	5.99	5.40	5.70
12	4.35	6.60	5.47	38	5.78	5.83	5.80
14	5.72	6.25	5.98	40	5.18	5.65	5.41
16	6.42	5.59	6.00	42	4.49	5.81	5.15
18	6.76	5.81	6.28	44	6.41	5.99	6.20
20	5.82	6.29	6.05	46	6.02	4.52	5.27
22	5.46	6.85	6.15	48	5.11	6.11	5.61
24	5.89	7.25	6.57	.....	.....	.....	.....

NO. 10.—TAKEN APRIL 16, 1880.

Distance out from left base	feet	300
Height of surface above low-water	do	23.3
Depth of water	do	59.0
Mean velocity in vertical plane	do	5.117
Ratio of mean to mid-depth velocity	do	1.036
Direction and force of wind, up		11.4

Depth.	Velocity.	Depth.	Velocity.	Depth.	Velocity.	Depth.	Velocity.
0	4.90	14	5.68	28	5.00	42	5.81
2	5.26	16	6.25	30	4.92	44	5.00
4	5.05	18	5.30	32	5.13	46	4.98
6	5.21	20	5.35	34	5.21	48	4.93
8	5.56	22	5.56	36	5.26	50	4.78
10	5.35	24	5.10	38	4.76	52	4.56
12	5.84	26	5.32	40	4.63	54	4.38

TABLE No. 3.—*Measurements of velocities in vertical planes*—Continued.

NO. 11.—TAKEN APRIL 23, 1880.

Distance out from left base	feet	300
Height of surface above low-water	do	23.2
Depth of water	do	59.0
Mean velocity in vertical plane	do	5.100
Ratio of mean to mid-depth velocity	do	1.041
Direction and force of wind, up		10.4

Depth.	Velocity.	Depth.	Velocity.	Depth.	Velocity.	Depth.	Velocity.
0	4.72	16	4.95	32	5.24	48	4.74
2	5.27	18	6.06	34	5.02	50	.....
4	5.26	20	4.88	36	5.53	52	.....
6	5.59	22	5.65	38	5.59	54	4.16
8	5.49	24	5.08	40	4.95	56	4.53
10	5.13	26	4.90	42	4.95	.....	.....
12	5.59	28	4.93	44	5.10	.....	.....
14	5.78	30	4.88	46	5.05	.....	.....

NO. 12.—TAKEN APRIL 30, 1880.

Distance out from left base	feet	365
Height of surface above low-water	do	21.9
Depth of water	do	58.0
Direction and force of wind, up		2.4

Depth.	Velocity.	Depth.	Velocity.	Depth.	Velocity.	Depth.	Velocity.
0	4.95	14	5.47	28	4.52	42	5.10
2	5.15	16	4.82	30	4.88	44	4.31
4	5.00	18	4.45	32	4.02	46	4.17
6	5.72	20	5.29	34	5.15	48	4.52
8	5.00	22	5.00	36	4.88	50	4.45
10	5.20	24	4.52	38	4.26	.....	.....
12	5.66	26	4.70	40	3.63	.....	.....

NO. 13.—TAKEN MAY 7, 1880.

Distance out from left base	feet	290
Height of surface above low-water	do	26.7
Depth of water	do	63.0
Mean velocity in vertical plane	do	5.706
Ratio of mean to mid-depth velocity		0.987
Direction and force of wind, up		8.1

Depth.	Velocity.	Depth.	Velocity.	Depth.	Velocity.	Depth.	Velocity.
0	5.18	15	5.81	30	5.81	45	5.81
1	5.99	16	5.75	31	5.72	46	6.25
2	6.37	17	5.46	32	5.88	47	5.00
3	6.25	18	5.71	33	5.85	48	5.00
4	6.13	19	5.91	34	5.17	49	7.03
5	6.49	20	5.55	35	5.72	50	5.68
6	6.45	21	5.65	36	5.72	51	5.05
7	5.82	22	5.71	37	6.10	52	5.23
8	6.25	23	5.56	38	5.68	53	4.68
9	5.68	24	5.66	39	6.06	54	4.92
10	6.37	25	5.71	40	5.47	55	5.05
11	6.10	26	5.56	41	5.29	56	5.81
12	6.29	27	5.75	42	5.05	57	5.03
13	6.02	28	5.26	43	5.38	58	5.57
14	6.17	29	5.59	44	5.35	.....	.....

TABLE No. 3.—*Measurements of velocities in vertical planes*—Continued.

NO. 14.—TAKEN MAY 11, 1880.

Distance out from left base.....feet.. 270
Height of surface above low-water.....do... 25.8
Depth of water.....do... 49.5
Direction and force of wind, calm.

Depth.	Velocity.	Depth.	Velocity.	Depth.	Velocity.	Depth.	Velocity.
0	6.25	12	5.88	24	5.95	36	5.07
2	6.06	14	5.56	26	5.61	38	4.86
4	5.72	16	5.56	28	5.49	40	4.59
6	6.13	18	5.03	30	5.05	42	5.12
8	5.91	20	5.00	32	5.46	44	4.88
10	5.49	22	5.75	34	5.08	.....	.....

NO. 15.—TAKEN MAY 21, 1880.

Distance out from left base.....feet.. 315
Height of surface above low-water.....do... 14.6
Depth of water.....do... 49.0
Direction and force of wind, up..... 0.5

Depth.	Velocity.	Depth.	Velocity.	Depth.	Velocity.	Depth.	Velocity.
0	4.05	12	3.43	24	3.09	36	3.33
2	4.05	14	3.34	26	3.33	38	2.97
4	3.75	16	3.31	28	3.05	40	3.30
6	4.07	18	3.75	30	3.16	42	3.07
8	3.75	20	3.12	32	3.08	44	2.72
10	3.38	22	3.15	34	3.30	.....	.....

NO. 16.—TAKEN MAY 25, 1880.

Distance out from left base.....feet.. 600
Height of surface above low-water.....do... 13.6
Depth of water.....do... 41.5
Direction and force of wind, up..... 5.8

Depth.	Velocity.	Depth.	Velocity.	Depth.	Velocity.	Depth.	Velocity.
0	4.02	10	4.31	20	3.83	30	3.57
1	4.03	11	4.03	21	3.86	31	3.46
2	4.00	12	3.94	22	3.75	32	3.27
3	4.13	13	4.19	23	3.66	33	3.50
4	3.96	14	4.16	24	3.76	34	3.39
5	4.15	15	3.85	25	4.20	35	3.79
6	4 04	16	3.81	26	3.76	36	2.97
7	4.03	17	4.02	27	3.36	37	2.87
8	4.03	18	3.90	28	3.52	38	2.67
9	4.00	19	3.77	29	3.70	.....	.....

TABLE No. 3.—*Measurements of velocities in vertical planes*—Continued.

NO. 17.—TAKEN JUNE 2, 1880.

Distance out from left base.....feet.. 540
Height of surface above low-water.....do... 14.0
Depth of water.....do... 44.0
Direction and force of wind, down..... 3.2

Depth.	Velocity.	Depth.	Velocity.	Depth.	Velocity.	Depth.	Velocity.
0	4.57	10	4.13	20	4.27	30	4.10
1	4.44	11	4.74	21	3.93	31	3.85
2	4.74	12	4.40	22	3.95	32	4.07
3	4.37	13	4.44	23	4.20	33	3.67
4	4.38	14	4.27	24	3.85	34	3.85
5	4.08	15	3.94	25	4.07	35	3.82
6	4.63	16	4.28	26	4.37	36	3.62
7	4.08	17	4.37	27	4.16	37	3.60
8	4.68	18	4.00	28	4.20	38	3.46
9	4.26	19	3.84	29	4.05	39	3.80

NO. 18.—TAKEN JUNE 8, 1880.

Distance out from left base.....feet.. 475
Height of surface above low-water.....do... 16.3
Depth of water.....do... 50.5
Direction and force of wind, up..... 4.

Depth.	Velocity.	Depth.	Velocity.	Depth.	Velocity.	Depth.	Velocity.
0	4.33	12	4.68	24	4.32	36	4.00
2	4.68	14	4.51	26	4.28	38	3.79
4	4.96	16	4.84	28	3.90	40	3.86
6	4.66	18	4.55	30	4.10	42	3.88
8	4.84	20	4.32	32	4.36	.....	.....
10	4.62	22	4.44	34	4.12	.....	.....

NO. 19.—TAKEN JUNE 17, 1880.

Distance out from left base.....feet.. 490
Height of surface above low-water.....do... 14.5
Depth of water.....do... 49.0
Mean velocity in vertical plane.....do... 4.136
Ratio of mean to mid-depth velocity..... 0.996
Direction and force of wind, down..... 11.0

Depth.	Velocity.	Depth.	Velocity.	Depth.	Velocity.	Depth.	Velocity.
0	5.20	12	4.55	24	4.12	36	3.72
2	4.65	14	4.25	26	4.24	38	3.61
4	4.44	16	4.57	28	3.92	40	3.51
6	4.61	18	4.50	30	4.09	42	.....
8	4.48	20	4.57	32	4.54	44	3.56
10	4.24	22	4.20	34	3.85	.....	.....

TABLE No. 3.—*Measurements of velocities in vertical planes*—Continued.

No. 20.—TAKEN JUNE 24, 1880.

Distance out from left base.....feet.. 530
Height of surface above low-water.....do.. 15.0
Depth of water.....do... 46.0
Direction and force of wind, up..... 6.2

Depth.	Velocity.	Depth.	Velocity.	Depth.	Velocity.	Depth.	Velocity.
0	4.03	11	4.55	22	4.00	33	3.95
1	4.44	12	4.29	23	4.33	34	3.92
2	4.57	13	4.37	24	3.94	35	4.26
3	4.52	14	4.31	25	4.35	36	3.97
4	4.50	15	4.54	26	4.17	37	3.90
5	4.52	16	3.78	27	4.26	38	3.80
6	4.83	17	4.39	28	3.90	39	3.51
7	4.45	18	4.47	29	4.10	40	3.44
8	4.87	19	4.22	30	4.30	.....	.....
9	4.31	20	4.19	31	4.08	.....	.....
10	4.67	21	4.65	32	3.94	.....	.....

No. 21.—TAKEN JUNE 29, 1880.

Distance out from left base.....feet.. 345
Height of surface above low-water.....do... 18.1
Depth of water.....do... 55.0
Direction and force of wind, calm.

Depth.	Velocity.	Depth.	Velocity.	Depth.	Velocity.	Depth.	Velocity.
0	4.57	14	4.71	28	4.70	42	4.83
2	4.81	16	4.40	30	4.30	44	3.72
4	5.05	18	4.87	32	3.94	46	3.77
6	4.78	20	4.42	34	4.33	48	3.59
8	4.44	22	3.73	36	4.63	.....	.....
10	4.42	24	4.59	38	4.61	.....	.....
12	4.35	26	4.63	40	4.44	.....	.....

No. 22.—TAKEN JULY 5, 1880.

Distance out from left base.....feet.. 415
Height of surface above low-water.....do... 19.3
Depth of water.....do... 53.0
Mean velocity in vertical plane.....do... 4.818
Ratio of mean to mid-depth velocity..... 0.935
Direction and force of wind, up..... 4.4

Depth.	Velocity.	Depth.	Velocity.	Depth.	Velocity.	Depth.	Velocity.
0	4.63	14	5.03	28	4.63	42	4.30
2	4.92	16	5.41	30	4.50	44	4.05
4	5.02	18	4.68	32	4.32	46	5.44
6	5.56	20	5.29	34	4.79	48	4.14
8	5.29	22	4.83	36	4.44	.....	.....
10	5.43	24	5.08	38	4.24	.....	.....
12	5.47	26	5.20	40	5.06	.....	.....

TABLE No. 3.—*Measurements of velocities in vertical planes*—Continued.

NO. 23.—TAKEN JULY 14, 1880.

Distance out from left base	feet	325
Height of surface above low-water	do	23.1
Depth of water	do	56.0
Mean velocity in vertical plane	do	5.104
Ratio of mean to mid-depth velocity		0.995
Direction and force of wind, up		3.8

Depth.	Velocity.	Depth.	Velocity.	Depth.	Velocity.	Depth.	Velocity.
0	5.60	14	5.32	28	5.13	42	5.15
2	5.56	16	5.65	30	4.68	44	4.36
4	5.13	18	5.44	32	5.00	46	4.86
6	5.62	20	5.43	34	5.08	48	4.37
8	5.90	22	5.35	36	4.70	50	4.76
10	5.35	24	5.44	38	4.70	.....	.....
12	5.10	26	5.08	40	5.08	.....	.....

NO. 24.—TAKEN JULY 22, 1880.

Distance out from left base	feet	490
Height of surface above low-water	do	17.2
Depth of water	do	49.0
Mean velocity in vertical plane	do	4.102
Ratio of mean to mid-depth velocity		0.977
Direction and force of wind, down		3.2

Depth.	Velocity.	Depth.	Velocity.	Depth.	Velocity.	Depth.	Velocity.
0	5.12	12	4.63	24	4.11	36	3.80
1	4.25	13	4.33	25	4.47	37	3.61
2	4.48	14	4.22	26	4.08	38	3.54
3	4.63	15	4.08	27	4.00	39	3.26
4	4.68	16	4.27	28	4.22	40	3.79
5	4.53	17	4.49	29	3.19	41	3.70
6	4.83	18	3.95	30	4.33	42	3.93
7	4.38	19	4.10	31	4.04	43	4.29
8	4.69	20	4.52	32	4.14	44	3.67
9	4.78	21	4.81	33	3.69	.....	.....
10	4.05	22	4.59	34	3.52	.....	.....
11	4.13	23	3.65	35	3.97	.....	.....

NO. 25.—TAKEN JULY 30, 1880.

Distance out from left base	feet	400
Height of surface above low-water	do	12.4
Depth of water	do	46.0
Direction and force of wind, up		4.5

Depth.	Velocity.	Depth.	Velocity.	Depth.	Velocity.	Depth.	Velocity.
0	3.50	10	3.43	20	3.25	30	2.86
2	3.40	12	3.53	22	3.23	32	3.33
4	4.33	14	3.52	24	3.07	34	2.91
6	3.38	16	3.34	26	3.18	36	2.76
8	3.63	18	3.23	28	3.36	38	2.90

TABLE No. 3.—*Measurements of velocities in vertical planes*—Continued.

No. 26.—TAKEN AUGUST 3, 1880.

Distance from left base ..... feet.. 290
Height of surface above low-water ..... do... 10.3
Depth of water ..... do... 45.5
Direction and force of wind, down 1.2

Depth.	Velocity.	Depth.	Velocity.	Depth.	Velocity.	Depth.	Velocity.
0	3.17	10	2.94	20	2.41	30	2.57
2	3.05	12	2.74	22	2.81	32	2.80
4	2.89	14	2.95	24	2.33	34	2.01
6	2.92	16	2.76	26	2.76	36	2.29
8	2.95	18	3.00	28	2.71	38	2.42

No. 27.—TAKEN AUGUST 9, 1880.

Distance out from left base ..... feet.. 580
Height of surface above low-water ..... do... 8.2
Depth of water ..... do... 35.5
Mean velocity in vertical plane ..... do... 2.872
Ratio of mean to mid-depth velocity 1.064
Direction and force of wind, calm.

Depth.	Velocity.	Depth.	Velocity.	Depth.	Velocity.	Depth.	Velocity.
0	3.56	9	3.10	18	2.85	27	2.75
1	3.15	10	3.04	19	2.86	28	2.61
2	3.18	11	3.03	20	2.81	29	2.49
3	3.19	12	3.16	21	2.95	30	2.63
4	3.06	13	3.19	22	2.70	31	2.46
5	3.18	14	3.00	23	2.83	32	2.49
6	3.18	15	3.05	24	2.95	33	2.59
7	3.02	16	3.06	25	2.81	34	2.60
8	3.15	17	2.60	26	2.69	.....	.....

No. 28.—TAKEN AUGUST 20, 1880.

Distance out from left base ..... feet.. 700
Height of surface above low-water ..... do... 6.4
Depth of water ..... do... 32.0
Mean velocity in vertical plane ..... do... 2.506
Ratio of mean to mid-depth velocity 1.036
Direction and force of wind, up 10.8

Depth.	Velocity.	Depth.	Velocity.	Depth.	Velocity.	Depth.	Velocity.
0	2.18	8	2.72	16	2.42	24	2.53
1	2.60	9	....	17	2.60	25	2.31
2	2.46	10	2.77	18	2.71	26	2.40
3	2.62	11	2.84	19	2.54	27	2.22
4	2.59	12	2.65	20	2.50	28	2.16
5	2.71	13	2.75	21	2.44	29	2.51
6	2.70	14	2.55	22	2.40	30	2.15
7	2.73	15	2.65	23	1.82	31	2.13

TABLE No. 3.—*Measurements of velocities in vertical planes*—Continued.

NO. 29.—TAKEN AUGUST 27, 1880.

Distance out from left base	feet	575
Height of surface above low-water	do	4.6
Depth of water	do	31.0
Mean velocity in vertical plane	do	2.020
Ratio of mean to mid-depth velocity	do	1.010
Direction and force of wind, up		3.4

Depth.	Velocity.	Depth.	Velocity.	Depth.	Velocity.	Depth.	Velocity.
0	1.87	8	2.29	16	2.00	24	2.03
2	2.15	10	2.21	18	2.10	26	1.84
4	2.23	12	1.97	20	2.10	28	1.81
6	2.13	14	2.00	22	1.84	30	1.69

NO. 30.—TAKEN AUGUST 31, 1880.

Distance out from left base	feet	700
Height of surface above low-water	do	5.6
Depth of water	do	30.0
Mean velocity in vertical plane	do	2.664
Ratio of mean to mid-depth velocity		0.983
Direction and force of wind, calm.		

Depth.	Velocity.	Depth.	Velocity.	Depth.	Velocity.	Depth.	Velocity.
0	2.90	8	2.85	16	2.60	24	2.53
1	2.76	9	2.85	17	2.69	25	2.45
2	2.93	10	2.72	18	2.49	26	2.33
3	2.91	11	2.78	19	2.63	27	2.50
4	2.78	12	2.74	20	2.65	28	2.27
5	2.86	13	2.83	21	2.60		
6	2.80	14	2.74	22	2.60		
7	2.81	15	2.71	23	2.50		

NO. 31.—TAKEN SEPTEMBER 10, 1880.

Distance out from left base	feet	445
Height of surface above low-water	do	8.0
Depth of water	do	38
Mean velocity in vertical plane		2.775
Ratio of mean to mid-depth velocity	do	1.043
Direction and force of wind, down		1.0

Depth.	Velocity.	Depth.	Velocity.	Depth.	Velocity.	Depth.	Velocity.
0	3.18	9	3.04	18	3.03	27	2.52
1	2.87	10	3.08	19	2.63	28	2.60
2	3.15	11	3.03	20	2.69	29	2.82
3	2.82	12	3.08	21	2.68	30	2.78
4	3.13	13	3.08	22	2.86	31	2.42
5	2.91	14	3.03	23	2.66	32	2.38
6	3.11	15	2.84	24	2.58	33	2.40
7	3.08	16	2.93	25	2.67	34	2.35
8	3.01	17	2.68	26	2.89		

TABLE No. 3.—*Measurements of velocities in vertical planes*—Continued.

NO. 32.—TAKEN SEPTEMBER 16, 1880.

Distance out from left base	feet..	630
Height of surface above low-water	do...	8.0
Depth of water	do...	34.5
Mean velocity in vertical plane	do...	2.991
Ratio of mean to mid-depth velocity		0.915
Direction and force of wind, up		4.0

Depth.	Velocity.	Depth.	Velocity.	Depth.	Velocity.	Depth.	Velocity.
0	2.79	9	3.20	18	3.06	27	2.93
1	3.15	10	3.00	19	3.15	28	2.81
2	3.23	11	3.13	20	2.76	29	2.55
3	3.13	12	3.13	21	3.16	30	2.80
4	3.26	13	3.22	22	3.03	31	2.53
5	3.11	14	3.01	23	3.25	32	2.65
6	3.25	15	2.92	24	2.78	33	2.58
7	3.12	16	3.00	25	2.81		
8	3.21	17	3.25	26	2.95		

NO. 33.—TAKEN SEPTEMBER 21, 1880.

Distance out from left base	feet..	640
Height of surface above low-water	do...	5.6
Depth of water	do...	32.5
Mean velocity in vertical plane	do...	2.662
Ratio of mean to mid-depth velocity		1.044
Direction and force of wind, down		6.2

Depth.	Velocity.	Depth.	Velocity.	Depth.	Velocity.	Depth.	Velocity.
0	3.23	8	2.93	16	2.51	24	2.63
1	3.00	9	2.75	17	2.71	25	2.59
2	2.90	10	2.70	18	2.58	26	2.40
3	3.00	11	2.70	19	2.67	27	2.38
4	2.87	12	2.77	20	2.74	28	2.47
5	2.91	13	2.72	21	2.65	29	2.31
6	2.86	14	2.83	22	2.63	30	2.16
7	2.92	15	2.85	23	2.80	31	2.21

NO. 34.—TAKEN OCTOBER 1, 1880.

Distance out from left base	feet..	625
Height of surface above low-water	do...	4.1
Depth of water	do...	31.5
Mean velocity in vertical plane	do...	2.061
Ratio of mean to mid-depth velocity		0.960
Direction and force of wind, up		6.4

Depth.	Velocity.	Depth.	Velocity.	Depth.	Velocity.	Depth.	Velocity.
0	2.02	8	2.25	16	2.10	24	1.73
1	2.30	9	2.13	17	2.22	25	1.78
2	2.38	10	2.29	18	1.94	26	1.96
3	2.30	11	2.16	19	2.10	27	1.92
4	2.27	12	1.99	20	2.06	28	1.98
5	2.27	13	2.23	21	1.79	29	1.70
6	2.36	14	1.99	22	2.04	30	1.59
7	2.31	15	2.34	23	1.78		

TABLE No. 3.—*Measurements of velocities in vertical planes*—Continued.

No. 35.—TAKEN OCTOBER 7, 1880.

Distance out from left base	feet	555
Height of surface above low-water	do	4.8
Depth of water	do	32.0
Mean velocity in vertical plane	do	2.290
Ratio of mean to mid-depth velocity		1.018
Direction and force of wind, up		7.8

Depth.	Velocity.	Depth.	Velocity.	Depth.	Velocity.	Depth.	Velocity.
0	2.62	8	2.54	16	2.23	24	2.29
1	2.49	9	2.53	17	2.23	25	2.04
2	2.52	10	2.57	18	2.28	26	1.89
3	2.36	11	2.55	19	2.08	27	2.11
4	2.60	12	2.33	20	2.27	28	2.05
5	2.51	13	2.57	21	2.07	29	2.00
6	2.55	14	2.24	22	2.03	30	1.94
7	2.49	15	2.37	23	1.96		

TABLE NO. 4.—*Slope observation.*

ALONG RIGHT BANK.

No.....	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.	21.	22.
Date	Dec. 19	Dec. 26	Jan. 3	Jan. 9	Jan. 15	Jan. 21	Jan. 28	Feb. 5	Feb. 20	Mar. 1	Mar. 5	Mar. 10	Mar. 18	Mar. 22	Mar. 29	Apr. 5	Apr. 21	Apr. 27	May 4	May 12	May 22	May 27
Above low-water	0.29	18.6	26.6	25.3	29.2	29.8	23.2	14.5	27.1	30.8	30.6	30.0	31.4	31.9	31.9	27.7	22.5	22.7	25.8	25.0	14.1	13.2
Rise or fall.	+0.10	+0.55	+0.10	0.00	+0.27	−0.10	−0.50	−0.35	−0.49	−0.08	−0.10	+0.04	+0.12	0.00	−0.03	−0.50	+0.26	−0.25	+0.30	−0.60	−0.23	−0.10
Stakes.	Fall.	Fall.	Fall.	Fall.	Fall.	Fall.	Fall.	Fall.	Fall.	Fall.	Fall.	Fall.	Fall.	Fall.	Fall.	Fall.	Fall.	Fall.	Fall.	Fall.	Fall.	Fall.
	Feet.	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*
A to B ..	.0640	.....	.0490	.0325	.0230	.0255	.0745	.0505	.0500	.0385	.0815	.0210	.0115	.0210	.0270	35	.....	.0115	.0105	.....	.0365	.....
B to C ...	.0605	.0670	.0620	.0320	.0320	.0645	.0435	.0405	.1200	.1685	.1295	.1725	...	.2205	.1695	.1020	.1145	.1015	.1280	.1025	.0490	.0610
C to D ...	.....	.0310	.0505	.0475	.0525	.0880	.0500	.0500	.0370	.0395	.0235	.0330	.2096	.....	.0270	.0625	.0450	.0930	.0955	.1050	.0510	.0630
D to E ...	.0910	.....	.0485	.0465	.0000	.0075	.0180	.0020	.0280	.0015	.0570	.0580	.0820	.0770	.0685	.1025	.0750	.0315	.0260	.0225	— 0035	—.0090
E to F ...	.0355	.0650	.0465	.0655	.0505	.0435	.....	.0280	.0320	.0560	.0265	.0395	.0685	.0540	.0755	.0500	.0920	.0780	.1005	.0880	.0590	.0570
F to G ...	.0095	.0415	.0510	.0720	.0745	.0845	.1130	.0510	.0775	.0850	.1225	.0910	.0575	.0795	.0935	.1015	.0050	.0250	.0315	.0265	.0300	.0465
G to H ...	.0650	.1220	.0910	.0650	.0465	.0610	.0625	.0740	.0820	.0545	.0430	.0845	.0625	.0940	.0975	.0810	.1420	.1265	.1175	.0935	.0670	.0090
H to I ...	.0295	.....	.0450	.0585	.0500	.0920	.0720	.....	.0615	.0945	.0980	.0965	.1175	.0875	.1140	.1155	.0670	.0570	.1205	.1185	.0145	.0580
I to J	.0430	.0600	.0535	.0145	.0505	.0065	.0075	.0545	.0355	.0265	.0260	.0025	.....	.0410	.0195	.0205	.0330	.0515	.0400	.0250	.0295	.0150
J to K ...	.0275	.0285	.....	.0215	.0405	.0265	.0335	.0320	.0350	.....	.0235	.0460	.0704	.0405	.....	.0300	.0580	.0435	.0260	.0565	.0265	.0225
Mean fall	.04109	.04008	.05313	.04399	.04056	.04190	.04580	.03740	.05393	.06034	.06100	.06170	.06560	.06900	.07397	.06461	.07017	.05978	.06721	.06161	.03472	.03119
A to K...	.....	.....	A to J	.....	.....	.....	.....	.....	.....	A to J	.....	.....	.....	.....	A to J	.....	B to K	.....	.....	.....	.....	B to K

ALONG LEFT BANK.

No.	23.	24.	25.	26.	27.	28.	29.	30.	31.	32.	33.	34.	35.	36.	37.	38.
Date	June 11.	June 18.	June 23.	June 30.	July 7.	July 13.	July 24.	July 29.	Aug. 12.	Aug. 27.	Sept. 3.	Sept. 11.	Sept. 15.	Sept. 24.	Oct. 2.	Oct. 7.
Above low-water	16.2	14.1	14.6	18.4	21.6	23.7	15.7	13.1	7.5	4.7	6.7	8.0	8.6	5.1	4.1	4.9
Rise or fall	— 0.25	— 0.27	+ 0.24	+ 0.10	+ 0.62	— 0.22	— 0.37	— 0.24	— 0.09	— 0.10	+ 0.13	+ 1.10	— 0.21	— 0.10	0.00	+ 0.08
Stakes.	Fall.	Fall.	Fall.	Fall.	Fall.	Fall.	Fall.	Fall.	Fall.	Fall.	Fall.	Fall.	Fall.	Fall.	Fall.	Fall.
	Feet.	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*
Q to R	.0705	.1000	.0710	.0520	.0560	.0405	.0580	.0285	.0385	.0330	.0506	.0410	.0610	.0450	.0610	.0550
R to S	— .0150	.0065	.0080	.0210	.0310	.0220	.0190	.0305	.0080	.0075	.0215	.0305	— .0015	— .0015	— .0005	— .0125
S to T	.0465	.0570	.0500	.0770	.0990	.1060	.0605	.0600	.0155	.0140	.0140	.0190	.0360	.0260	.0210	.0240
T to U	.0785	.0425	.0595	.0870	.1080	.1210	.0465	.0190	.0115	.0095	.0115	.0325	.0215	.0135	.0245	.0195
U to V	.0525	.0460	.0605	.0570	.0825	.1795	.0635	.0497	.0330	.0225	.0255	.0295	.0475	.0205	.0165	.0145
V to W	.0950	.0875	.0715	.1255	.1910	.0975	.0825	.1078	.0210	.0025	.0175	.0415	.0175	.0145	.0085	.0205
W to X	— .0210	— .0100	— .0105	— .0295	— .0490	— .0715	— .0135	.....	— .0255	.0035	— .0045	— .0245	— .0095	— .0175	— .0105	— .0125
X to W	.1035	.0665	.0710	.0880	.0745	.0860	.0805	.0310	.0655	.0230	.0280	.0540	.0560	.0490	.0510	.0440
Y to Z	.1375	.1550	.1895	.2000	.2265	.2655	.1730	.1465	.0690	.0405	.0695	.0625	.0835	.0415	.0255	.0355
Mean fall Q to Y	.05131	.04950	.04762	.05980	.07412	.07263	.04962	.04081	.02094	.01444	.02044	.02670	.02856	.01870	.02140	.01906

TABLE No. 5.—*Errors in mean velocity.*

FORMULAE.

Number.	Date.	Gauge.		Dimensions of cross-section.			Mean velocity.	Slope.	Constant in Chezy's formula.	H. and A. formula.	De Prony's formula.	Hagan's formula.	Mean depth.
		Above low water.	Rise or fall.	Area.	Width.	Mean depth.							
		Feet.	*Feet.*	*Sq. feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*		*Feet.*	*Feet.*	*Feet.*	*Feet.*
37	Oct. 2	4.1	0.00	72,790	2,455	29.6	2.14	2,140	85.0	— 1.63	— 0.19	— 1.84	— 0.16
32	Aug. 27	4.7	— .10	72,940	2,465	29.6	2.20	1,444	106.2	— 1.21	+ 0.29	— 1.53	— 0.10
38	Oct. 7	4.9	+ .08	74.830	2,463	30.4	2.37	1,906	98.4	— 1.34	+ 0.14	— 1.59	— 0.05
36	Sept. 24	5.1	— 0.10	75,105	2,467	30.4	2.35	1,870	98.6	— 1.35	+ 0.15	— 1 59	— 0.07
33	Sept. 3	6.7	+ .13	77,810	2,500	31.1	2.68	2,044	106.3	— 1.14	+ 0.35	— 1.37	+ 0.15
31	Aug. 12	7.5	— .09	82,260	2,501	32.9	2.82	2,094	107.4	— 1.14	+ 0.39	— 1.36	— 0.02
34	Sept. 11	8.0	+ .10	84,440	2,508	33.6	3.03	2,670	101.2	— 1.22	+ 0.26	— 1.37	+ 0.07
35	Sept. 15	8.6	— .21	84,555	2,516	33.6	3.09	2,856	99.6	— 1.24	+ 0.22	— 1.36	+ 0.13
30	July 29	13.1	— .24	96,480	2,549	37.8	3.96	4,081	100.8	— 1.07	+ 0.32	— 1.04	+ 0.22
22	May 27	13.2	— .10	100,108	2,555	38.4	3.76	3,119	108.6	— 0.98	+ 0.55	— 1.07	— 0.10
21	May 22	14.1	— .23	99,945	2,556	39.1	3.90	3,472	105.8	— 1.02	+ 0.48	— 1.06	— 0.10
24	June 18	14.1	— .27	100,800	2,563	39.3	4.04	4,950	91.6	— 1.35	— 0.05	— 1.23	— 0.01
8	Feb. 5	14.5	— .35	102,630	2,532	40.7	4.41	3,740	113.0	— 0.70	+ 0.79	— 0.71	+ 0.07
25	June 23	14.6	+ .24	102,930	2,569	40.1	4.22	4,762	96.6	— 1.18	+ 0.27	— 1.07	+ 0.01
29	July 24	15.8	— .37	102,240	2,572	39.4	4.51	4,962	102.0	— 0.89	+ 0.41	— 0.77	+ 0.44
23	June 11	16.2	— .25	106,065	2,582	41.1	4.49	5,131	97.8	— 1.08	+ 0.23	— 0.93	+ 0.06
2	Dec. 26	18.6	+ .55	114,142	2,554	44.7	5.33	4,008	125.9	— 0.23	+ 1.40	— 0.14	+ 0.10
1	Dec. 19	20.9	+ .10	120,982	2,563	47.2	5.96	4,109	135.3	+ 0.31	+ 1.87	+ 0.36	+ 0.12
27	July 7	21.6	+ .62	123,550	2,606	47.4	5.88	7,412	99.2	— 0.69	+ 0.38	— 0.31	— 0.01
17	Apr. 21	22.5	+ .26	121,110	2,596	46.6	5.78	7,017	101.1	— 0.64	+ 0.47	— 0.31	+ 0.09
18	Apr. 27	22.7	— .25	119,898	2,598	46.1	5.84	5,978	111.2	— 0.30	+ 0.97	— 0.05	+ 0.27
7	Jan. 28	23.2	— .50	125,370	2,563	49.9	5.95	4,580	125.7	+ 0.03	+ 1.60	+ 0.14	— 0.31
28	July 13	23.6	— .22	121,740	2,616	46.5	6.17	7,262	106.2	— 0.30	+ 0.77	+ 0.00	+ 0.50
20	May 12	25.0	— .60	130,698	2,612	50.0	6.13	6,161	110.4	— 0.32	+ 0.98	— 0.04	— 0.42
4	Jan. 9	25.3	— .00	132,851	2,578	51.5	6.10	4,399	128.2	+ 0.10	+ 1.68	+ 0.18	— 0.85
19	May 4	25.8	+ .30	129,672	2,608	49.7	6.56	6,721	113.5	— 0.01	+ 1.19	+ 0.32	+ 0.09
3	Jan. 3	26.6	+ .10	138,240	2,578	53 7	6.90	5,313	129.2	+ 0.46	+ 1.94	+ 0.66	— 0.65
9	Feb. 20	27.1	+ .49	134,010	2,581	51.9	7.09	5,393	134.0	+ 0.74	+ 2.09	+ 0.94	+ 0.03
16	Apr. 5	27.7	— .50	132,642	2,584	51.3	6.41	6,461	111.3	— 0.20	+ 1.06	+ 0.11	— 0.48
5	Jan. 15	29.2	+ .27	141,570	2,592	54.6	7.37	4,056	156.6	+ 1.31	+ 2.98	+ 1.36	— 0.44
6	Jan. 21	29.8	— .10	144,012	2,600	55.4	7.13	4,190	148.0	+ 0.97	+ 2.66	+ 1.04	— 0.91
12	Mar. 10	30.0	+ .04	138,915	2,598	53.5	7.47	6,170	130.0	+ 0.80	+ 2.13	+ 1.09	— 0.03
11	Mar. 5	30.6	— .10	141,165	2,600	54.3	7.39	6,100	128.4	+ 0.68	+ 2.05	+ 0.97	— 0.33
10	Mar. 1	30.8	— .08	136,323	2,599	52.4	7.60	6,034	135.2	+ 1.03	+ 2.38	+ 1.31	+ 0.41
13	Mar. 18	31.4	+ .12	140,040	2,608	53.7	7.91	6,560	133.3	+ 1.12	+ 2.40	+ 1.46	+ 0.36
15	Mar. 29	31.9	— 0.3	140,520	2,615	53.7	7.74	7,397	122.8	+ 0.74	+ 1.89	+ 1.15	+ 0.19
14	Mar. 22	31.9	.00	142,350	2,607	54.6	7.41	6,900	120.7	+ 0.48	+ 1.71	+ 0.84	— 0.40
Sum										30.00	39.68	32.73	— 8.75
Mean									114.2				

TABLE NO. 6.—*Dimensions of cross-sections, &c.*

PLUM POINT REACH.

Number of cross-sections.	Distance.	Low-water, November 13, 1879.						26.6 feet above low-water, January 3, 1880.					
		Surface width.	Area.	Mean velocity.	Mean depth.	Channel depth.	Fall from Driver's gauge.	Surface width.	Area.	Mean velocity.	Mean depth.	Channel depth.	Fall from Driver's gauge.
Plum Point reach.	*Feet.*	*Feet.*	*Sq. feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Sq. feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*
27	.....	2,020	59,560	1.33	29.5	32.0	.....	7,900	185,210	5.15	23.4	.....	.....
31	4,600	2,875	51,560	1.53	17.9	37.0	.....	6,600	168,520	5.67	25.6	.....	.....
Bullerton section.													
1	5,340	4,417	50,810	1.55	11.5	20.0	.....	7,300	212,680	4.49	29.1	43.0	.....
2	1,060	5,320	52,340	1.51	9.9	16.0	.....	7,485	220,700	4.32	29.5	39.0	.....
4	1,020	7,333	50,770	1.55	6.9	10.0	.....	7,900	230,360	4.14	29.2	35.0	.....
6	1,040	6,535	42,040	1.88	6.4	11.0	0.19	8,565	234,190	4.08	27.4	32.0	0.06
9	1,660	6,250	37,770	2.09	6.0	14.0	0.83	8,680	243,000	3.93	28.0	37.0	0.19
Craighead section.													
.....	1,200	6,010	39,620	2.00	6.5	17.0	1.30	8,840	260,000	3.67	29.4	36.0	0.30
3	1,880	5,375	52,280	1.51	9.9	26.0	1.75	8,150	249,820	4.00	30.7	41.0	0.37
5	2,260	4,250	36,080	2.19	8.5	28.0	2.29	7,610	229,030	4.17	30.1	52.0	0.49
6	1,300	3,550	40,595	1.94	11 4	33.0	2.65	7,610	231,000	4.13	30.4	54.0	0.59
7	1,300	4,575	41,930	1.90	9.2	31.0	2.98	7,600	220,620	4.33	29.0	55.0	0.66
8	1,500	4,450	37,800	2.09	8.5	21.0	3.39	7,930	244,410	3.91	30.8	47.0	0.79
9	1,180	4,810	34,020	2.32	7.1	20.0	3.74	8,010	227,230	4.17	28.4	45.0	0.87
10	1,200	3,190	40,930	1.93	12.8	23.0	4.04	7,250	203,970	4.68	28.1	49.0	1.03
11	1,420	2,267	30,220	2.61	13.3	25.0	4.36	6,170	175,740	5.43	28.5	55.0	1.29
12	1,510	3,210	32,680	2.42	10.2	26.0	4.60	5,490	167,770	5.69	30.6	59.0	1.51
13	1,480	3,467	41,650	1.90	12.0	18.0	4.90	6,530	175,850	5.43	27.0	54.0	1.63
14	1,500	3,183	46,680	1.70	14.7	28.0	5.05	7,340	175,500	5.43	23.9	57.0	1.83
15	1,400	2,958	40,200	1.97	13.6	29.0	5.22	6,570	176,300	5.41	26.1	57.0	2.00
16	1,500	2,625	48,740	1.62	18.6	31.0	5.34	5,990	168,650	5.60	28.2	56.0	2.22
17	1,400	2,358	48,110	1.64	20.2	34.0	5.41	5,300	170,200	5.61	31.9	62.0	2.41
18	1,460	2,192	49,325	1.60	22.5	30.0	5.51	4,840	159,350	5.99	33.0	64.0	2.68
19	1,480	2,517	51,935	1.52	20.6	31.0	5.52	4,920	154,600	5.17	31.4	62.0	2.90
20	1,600	2,317	56,660	1.40	17.1	27.0	5.53	5,600	199,850	4.78	35.7	59.0	2.83
21	1,500	3,983	59,210	1.33	14.9	24.0	5.54	6,180	217,650	4.39	35.1	52.0	2.88
22	1,800	5,200	51,690	1.53	10.0	22.0	5.57	6,450	229,000	4.08	35.5	49.0	2.96
23	2,700	3,600	41,530	1.90	11.5	54.0	5.66	5,480	196,830	5.00	34.8	74.0	3.30
24	2,700	2,125	45,870	1.72	21.6	58.0	5.60	3,760	143,510	6.65	38.2	81.0	2.90

25	2,950	1,858	54,740	1.45	29.5	74.0	5.70	2,340	141,930	6.72	60.7	135.0	4.23
26	1,640	1,375	60,000	1.34	43.6	66.0	5.70	1,680	94,500	10.10	56.2	112.0	5.22
27	2,540	1,733	66,600	1.19	38.6	53.0	5.70	2,080	109,625	8.76	52.7	75.0	5.04
Fulton section.													
1	2,000	2,060	68,500	1.15	33.3	44.0	5.71	2,450	128,330	7.41	52.8	71.0	4.83
2	1,500	2,380	68,500	1.15	28.8	40.0	5.71	2,500	129,850	7.35	52.0	64.0	4.90
4	1,000	2,365	65,820	1.20	27.8	36.0	5.72	2,578	138,240	6.90	53.7	65.0	4.91
5	500	2,300	68,250	1.16	29.7	45.0	5.72	2,550	134,550	7.09	52.8	72.0	4.91
7	1,500	2,502	61,470	1.29	24.6	36.0	5.73	2,685	131,140	7.28	48.8	61.0	5.02
8	1,500	2,612	66,600	1.19	25.5	34.0	5.73	2,790	133,610	7.06	48.2	57.0	5.11

[Appendix E will be found among the drawings accompanying this report.]

APPENDIX F.

REPORT OF THE COMMITTEE ON OUTLETS AND LEVEES UPON THE DEGRADATION OF THE BANKS OF THE RIVER AND ITS EFFECTS ON THE NAVIGATION.

SAINT LOUIS, *October* 2, 1881.

General Q. A. GILLMORE,
U. S. Engineer, President Mississippi River Commission:

SIR: The committee on outlets and levees beg leave to report:

Definite information relative to the early condition of the banks of the Mississippi River is very meager. The motives which actuated the discoverers and early adventurers did not direct their observation to such facts as would enable us to compare the early state of the river and its banks with their modified conditions when cleared, drained, cultivated, and navigated by steamboats.

From the general tenor of the early accounts we may abstract the following observations:

The immediate banks were densely grown with cane and forests. Allusion is constantly made to the "Arundo gigantea." Concerning this growth, Darby states: "Repeated observation has proved that cane is never the product of land subject to repeated inundations from the Mississippi floods. The margin of cane marks, with unerring precision, the line that separates the overflow lands from those that have been, by repeated efforts of nature, wrested from the partial dominion of water. Cane, though always found on very rich land, mostly black and sandy loam, near the banks of rivers, creeks, and lakes, cannot exist in water, and, perhaps, of all culmiferous vegetables, would flourish longest without water."

The same observation is true of other growth characteristic of the early banks, but not now found to any great extent upon the margin of the river. But cane, although it would not occupy a site that was not generally exempt from overflow, would, when once located, serve to maintain and increase this elevation. It would be difficult to constitute any device better adapted than a canebrake to arrest sediment and produce elevation of surface grade. One account (Pittman) speaks of a small abatis of driftwood formed along the margin by the draft of the escaping water, which would serve a similar purpose.

Frequent mention is also made of outlets, not only of the important ones now existing, but of minor ones, probably in each bend. We extract from Darby's Statistics of Louisiana (1817) as follows:

"In common years the rise begins about the 1st of March and increases rapidly until the river's bed, glutted, throws the superfluous water through innumerable channels into the back reservoirs. The increase of elevation is then slow, and a diurnal decrement is perceived, owing to the continually increased surface that must be overflowed. Many outlets occur between the head of the Tensas and the mouth of Red River, all of which carry their waters into the Tensas, Black, or Red Rivers. But few lakes, in the true acceptation of the term, are found. The banks of the river are generally above overflow, and are composed of the most productive soil, gradually sloping back by an inclination that gives from $\frac{1}{4}$ to $1\frac{1}{2}$ miles width before the plain sinks below the surface of high-water."

Along the coast thus described is now the heaviest leveeing on the river.

John McDonough testified before a legislative committee of Louisiana that, "When he first traveled the banks of the Mississippi River, some fifty years since (about 1800), on horseback, he was forced to swim his horse across at least 20 or 30 different bayous, some of them 50 or 60 feet in width, which crossed the path he traveled." These bayous were on the west bank between Plaquemine and Red River. Had the overflow of the bank been general, as it would now be every year, without levees, the route would have been impracticable.

Although the personal evidence bearing on this question is too meagre to be satisfactory, yet the physical reasons are so cogent as to leave no doubt that the elevation of the banks of the river, before the lands adjacent to the main stream, and in the basins of its tributary streams, were cleared and cultivated, conformed much more nearly to the flood plane of the river than they do at present, and they are now so degraded by causes to be cited hereafter, that the building of levees, originally undertaken for reclamation, has now become a question of maintaining artificially the former height of banks to preserve navigation.

In support of this position, we direct your attention to the bank-building process as now going on under natural conditions. Below the Forts Jackson and Saint Philip the banks are approximately at the level of flood plane. The highest waters are generally the most fully charged with sediment, and, during their prevalence, the deposit which makes the bank is greatest. The waters passing from the bed of the stream are filtered by the marsh grasses, and leave their contribution of sediment on

the margin of the bank. The conditions we observe there have existed at each point up to the head of the delta. The first banks of the river have always been built up to high-water mark, and have so been maintained except where caving has been excessively rapid, or levees have excluded the required material.

This method of bank building is also exemplified at every crevasse. It is there found that when access is given to the sediment-charged waters, the banks are speedily built up to a greater elevation than that upon which the broken levee was located. The deposits found around Bonnet Carré crevasse, about one-half mile from the break, nearly inclosing it, and extending back 4 or 5 miles to Lake Pontchartrain, are 10 or 12 feet high. Through these sand hills, outlets, generally the old drainage canals of the abandoned plantations, keep themselves open. The deposit is formed in the eddy on each side of the break, and in the first wooded land encountered in its flow. Its formation is also modified, in different cases, by the form of the discharged section. If the escaping water only runs over the bank without eroding it, deposit commences within a very short distance, the lateral expansion and diminution of depth resulting in such a loss of velocity as produces deposits. Should the violence of the discharge, however, scour out a channel of deeper section, it only deposits its sediment at a greater distance.

We can, perhaps, find the most conclusive evidence on this subject in the height of the banks of cut-off lakes—particularly those formed previous to the settlement of the country, while the river had its natural operation in building its banks. As an instance thereof we submit a sketch map and profiles of the bank of the river in front of Lake Concordia and of the west bank of the lake. The date of the cut-off is not known. It should be stated that the parts of the profiles between the points A and B do not fairly bear upon the discussion, for the earlier profile (in black) crosses the swamp which makes up in rear of the point, while the latter profile (in sienna) follows the high bank of the point. This part of the profile is not, therefore, considered in the mean comparative elevations hereafter given.

It should also be stated that the profile of the present bank runs for almost its entire length, outside of the levee, where considerable deposit is always made, giving to the profile a higher grade than really belongs to the bank, as it would practically stand were the levee removed.

These profiles are similar in following concave banks, where, presumably, the rate of caving and height of bank characteristic of the two periods would be found.

It is therefore believed that this comparison is not unfair as exaggerating the general relative condition as regards the heights of the original banks of the river, and those existing under its present disturbed condition.

It will be observed that in many places on the earlier line, back of the lake, the bank is above the very high floods of later years. Many such points are to be found elsewhere on the river.

The main height of the bank of the present river, referred to a common datum plane, is 148 feet, while the height of the bank of the old river around the lake is 153 feet 9 inches, or 5 feet 9 inches higher.

In estimating this difference of bank grade during the two periods under discussion, reference is made to a uniform average flood height. There is no evidence that this has been raised since the settlement of the country, or by the building of levees. The question has been elaborately argued by Mr. G. W. R. Bayley, in the transactions of the American Society of Civil Engineers, No. CXXI, and in other places. He concludes: "There is no evidence that the normal flood line of the Mississippi River from Red River to the head of the passes (except where affected by cut-off) is a fraction of an inch higher now than in 1717, before the commencement of the levee system, but there is evidence that it is not higher." Professor Forshey concurs in the subsequent discussion, both giving many observed points in support of their argument.

The following views were expressed by General Warren in the discussion alluded to:

"Obviously we cannot get the increased scour, until we build the levees and close the outlets, so as to confine the escaping flood waters. * * * Granting everything to this hypothesis of an enlarging channel, does it not seem more probable that the levees, *at first*, would have to be as high as if the bed was unchangeable, even though when once the water was actually confined to the channel, the flood heights should afterwards, through many years of erosion, gradually diminish."

While these remarks certainly suggest the precautions which would be necessary in applying a levee system, such as working from down stream upwards, with such speed only as would allow the completed work to develop its results, it does not impugn its correctness in principle nor its possibility in practice. These precautions, doubtless from the progression of settlement from down stream up, and not from design, seem to have been generally practiced in the application of the system to the Mississippi.

The compilation of high-water marks at Natchez, extending back to 1802, made by Humphreys and Abbot, and brought down to date by Humphreys and Abbot, and brought down to date by the United States Engineer Corps, is strongly corroborative of our position, including, as it does, upwards of thirty years before the extension of levees

above Red River, the period of their construction, and about thirty years of tolerably faithful maintenance.

This record is plotted as Fig. No. 1, on sheet No. 3, accompanying, from which it will be observed that there is no change in the flood elevation during this period of 80 years. In this connection we refer to the testimony of Mr. Caldwell relative to the effect upon the Atchafalaya River, of closing its outlets, which will be given hereafter, together with other authorities on this subject.

We therefore assume that it is established that the average flood-plane has not raised since the settlement of the country and the building of levees, the enlargement of the channel or bed having kept pace with the increased quantity of water retained therein, and that then the grade of the bank conformed much more closely to that plane than it does to-day—being only a little below, and, perhaps, in some places, a little above—probably lower in the bends and higher in the points. The escape of water in average floods was probably confined to the outlets, with, in great floods, a shallow flow over the banks. Now, however, we constantly find long distances of levee of a height from 10 to 15, 18, and even 20 feet, exclusive of the dikes across defined outlets. It is believed that the levees will average, throughout their entire length, from 7 to 8 feet in height. They stand now, in fact, as part of the normal bank of the river.

Among the causes which have produced this change, we consider the following as important:

1. The clearing of the banks has accelerated the rate of caving, and has removed the conditions favorable to the arrest of sediment, and the elevation of the land thereby. It is certainly observable, both in surveys and in an examination of the river banks, that forests exert considerable influence in retarding the caving. Wooded banks generally stand a little in advance of the shore line of an adjacent clearing. As soon as this projection becomes sufficient to expose them to great stress of current they also cave, but the observed facts are sufficient to justify the opinion that when the line of forest was unbroken and accompanied by cane brakes, trailing boughs and vines, the interlacing of roots and the tenacity of the sod, the rate of caving was considerably slower than at present.

Corroborating this view is the increased number of cut-offs. The trace of these characteristic changes in the river is well nigh indelible. They lie for centuries, lakes embosomed in the recesses of the swamp, retaining the distinctive marks of their origin, the high alluvial bank, the width, and to a great extent the depth, of the present stream. Of these cut-off lakes about thirty-one can be already recognized below Cairo, probably completing a record extending back many centuries. But of this number not less than twelve, or about two-fifths, have occurred since the beginning of the present century. Each one intensified the activity of the cause by which it was produced, increasing the current and the caving above and below, and directing it against new points of attack, composed of recent deposits of sand, which disappear with apalling rapidity.

2. Other causes geographically remote, and extending throughout the tributary valleys, have contributed.

An immense mass of observations has been collected in this country and in Europe upon the effects of clearing, cultivating, and such other changes as have been rapidly going on in all the States bordering the tributaries of the Mississippi; upon the climate, rainfall, and drainage. Although much remains in doubt and indefinite, yet all testimony is concurrent to the establishment of certain conclusions, which theory would have led us to anticipate. The deforesting of extensive tracts, although it cannot be surely said to have affected the aggregate amount of rainfall, yet certainly has made the climate more irregular. The rains are less frequent, but more violent. The summers are longer and the winters shorter. Clearing, and the consequent loss of the layers of leaves, mold, and sod beneath the forests, has increased the surface drainage at the expense of that part of the precipitation arrested, absorbed, and stored in the depths of the earth as a supply for perennial springs which furnish the low-water volume of the streams. The breaking of the sod by plowing exposes the surface to erosion of earthy and vegetable matter, sand, and still larger material swept by the more rapid drainage of the surface into and down the beds of the streams. It is the observation of pilots that the amount of gravel in the river has largely increased in the past thirty years. This must come mainly from the hillsides of the tributaries, and forms bars, which offer more resistance to erosion than the sandy and friable banks of the river.

It is therefore true that the agricultural development of the tributary basins of the Mississippi have contributed to make the floods of that river more violent and rapid, to protect the low-water season and to add to the erosion and quantity of sediment moved by floods, and the sand and gravel bars of low-water. These views concerning the effect of deforesting and cultivation are entertained by Humphreys and Abbot, and all authorities who have written on the subject. These changes of regimen are intimately and injuriously connected with the obstruction of navigation and the caving of the banks. To them may also be added the wash of steamboat waves, as hav-

ing a destructive effect upon the banks and levees, particularly at certain stages of the river.

Since the condition of alluvial bank construction is that deposit is more rapid on the immediate front than in the rear, giving a fall of surface back from the river, it follows that the recession of the shore line by caving brings it where the surface grade is lower. If the caving is slow, the maintenance of bank elevation, by deposit, may keep pace with it, but if rapid, the degradation of the shore line accompanies its recession. This low grade is rendered permanent by the building of levees, which excludes the sediment-charged flood waters, and prevents bank elevation by the natural process of deposit.

The time has passed when we can deal with the causes of change and deterioration heretofore cited. We cannot arrest the continued settlement of the basins and of the immediate banks of the stream, nor the attendant processes of clearing, draining, reclaiming. In any plan of improvement it must be recognized that the banks of the river have been lowered from their normal height several feet by causes that will increase for many years—that this former elevation of bank is restored, and the dispersion of flood waters restrained by artificial embankments—that these are in precarious condition, requiring constant repair, and an extension, of more or less importance, in the plan recommended in our previous reports.

Therefore, apart from this extension, which has been partially discussed in previous reports of the commission as a work that would be of auxiliary importance, does not the question of levees, in view of the foregoing discussion, assume greater importance than has been allowed heretofore?

Would not the navigation of the river be most seriously obstructed if the normal banks were lowered 7 or 8 feet, as they now would be by the obliteration of levees, so as to allow the dispersion of flood waters at a stage that much lower than the height which the river established, in compliance with the laws of its regimen?

Do not the present levees, instead of being only supplementary works, built on top of the banks, stand as a part of the normal bed, giving that height of bank, and maintaining that restraint upon the flood waters which were established as conditions of its regimen?

That the importance of these views may be realized, we beg leave to state that the levees of the Mississippi River probably average—from the best information available—8 feet in height, and, together with the hills which, when they approach the river, render levees unnecessary, extend on both banks, in serviceable condition, for a distance of 1,600 miles, out of a total alluvial shore line of about 2,200 miles. They attain occasionally a height of from 15 to 20 feet, exclusive of the dikes, closing well-defined outlets—when they frequently have a height of 40 feet. Were these dikes removed, they would admit the main supply of the largest rivers in the valley. The Yazoo Pass bears this relation to the Yazoo and Tallahatchie rivers, Hushpucuna to Sunflower, Lake Bolivar to Deer Creek, Lake Providence to the Tensas, and Gaines Landing levee to Bayou Maçon. The same is true of many of the bayous connecting with the Saint Francis and Little rivers. The commission has already reported adversely to the influence of such lateral channels.

Also, below many of the largest of these artificial embankments are parts of the river where navigation is now exceedingly difficult. For instance, between Yazoo Pass and Old Town Bayou is Montezuma Bar, where is found a shifting channel, going down to 7 feet. Below the outlets on the south side of Cypress Creek, which lead into the Tensas Bottom, is Choctaw Bend, a very bad stretch of river, the low-water channel being tortuous and uncertain, with, at times, a depth of only 5 feet. Immediately below Ship's Bayou levee, with a height of upwards of 20 feet, shutting off overflow into lakes Saint Joseph, Bruin, Saint John, and the Tensas Bottom, is Bondurants, a bar going down to 8 feet or less. Certainly the maintenance of volume is important in preventing the increase of such obstructions.

But apart from these, as extreme cases, is not the retention of such part of flood discharge as is now held by an average height of 7 or 8 feet of artificial embankment necessary to maintain the navigation of the river in its present condition. Without these, the most moderate floods would overtop the banks and disperse their waters through the innumerable lateral swamp drains from bluff to bluff, with loss of velocity and consequent obstruction of channel.

If this description of the present status of levees is true, it must be borne in mind that the causes by which it was brought about are not local, but exist in every tributary valley. The disturbance of the forest and sod covered surface and the undue precipitation of drainage extend to the headwaters of the Mississippi, of the Ohio, and of the Missouri, while the remedies which have been opposed to these evils, the placing artificial barriers to such dispersion of flood waters as would have been highly injurious to navigation, and the maintenance of these barriers, have been exclusively done by the riparian States and proprietors. While doubtless the motive was reclamation and self-protection, we believe that much of the benefit accrued to other sections of the country equally interested in the navigation of the river, and equally respon-

sible for its deterioration. Without discussing the equity of this condition of affairs, we earnestly represent that it is extremely hazardous, as a system of such character and magnitude can only be maintained by unity of administration, by promptness of action, and by large expenditures. Neither of these is, or can be, secured while the work is left under the present management. Its history sustains this statement.

We desire to submit with this report some of the facts observed and opinions entertained by competent authorities concerning the effects on outlets and levees on the Mississippi, and streams connecting with it.

General Barnard, United States Engineers, in communication with De Bow's Review, in 1850, writes:

"I have but few words to say on the subject of levees. If the results I have given in this paper are correct, then the levee system, instead of favoring, as is alleged, the tendency of the bed of the river to rise, has precisely the reverse effect. By confining the waters within their limits, they increase the velocity and abrading power of the current, causing a deepening rather than an elevation of the bed. The velocity may become too great for convenience, causing a rapid destruction of the banks; but the tendency to prevent the elevation of the bed is not the less true. It may safely be affirmed, therefore, that the bed of the river is lower now than it would have been had no levees been made."

He sustains these conclusions by arguments from Dubuat, by instances from Frisi and other authorities, of European rivers, and by his personal observations of the Mississippi River.

In 1858 he writes to Mr. G. W. R. Bayley a letter published in the New Orleans Picayune, February 21, 1859, and in pamphlet form, declaring:

"There is but *one* protection for Louisiana, and that is levees. Outlets, or lateral vents of any kind may be discussed, adopted by State authorities, *perhaps attempted*. If so, they will certainly deluge the unfortunate district through which their discharge is carried, while they utterly fail to relieve the river, producing, on the other hand, deposits in its bed, which they will eventually raise, and, with it, the surface.

"I have already stated that I, during the floods of 1849 and 1850, gave the phenomena of the river some study, and I was not long in arriving at a conclusion on the subject of outlets. My views as then entertained, and the results I arrived at will be found in the July number of De Bow's Review, for 1850. I should mention that though many of the data used in that investigation are incorrect, the general conclusions arrived at are not affected by such inaccuracy."

In support of his views the following authorities are used by him:

"Against the *assumption* on which these extravagant measures are based let me quote the words of a gentleman (Professor Forshey) who has given as much attention to the Mississippi as any other in the United States, remarking that they are fully confirmed by observations and by facts which cannot be gainsaid. If necessary I would here reaffirm what I have so often and so amply proved, namely, that the effects of levees have never yet, nor will they ever (probably) raise the surface of the river's discharge in this lower portion of the valley. The high-water mark has not sensibly changed in the one hundred and twenty years of levee history, at and near New Orleans."

Again:

"The investigations to which I allude were made while the great Bonnet Carré crevasse of 1850 was in full flow. On the 30th of July (immediately after the fall of the river) its bed was examined by Professor Forshey and others, who found that immediately below the crevasse it was obstructed by a shoal which diminished the mean depth about 12 feet, and the area of cross-section 75,613 square feet as compared with its section above the crevasse. A more extraordinary confirmation of a result of pure reasoning, by the actual results of the operations carried on by nature, on a great scale, has rarely been presented. To the statements of the results of this examination Professor Forshey appends the following note: 'Soundings made in the high-water of 1851 proved that the great sand bar thrown across the channel of the river, below the crevasse, by the weakness of its transporting forces, was carried away again when the river was confined by the new levee and rose high enough to assume its greatest velocity.' Similar effects have been observed to be produced by other crevasses (witness the extraordinary deposits in front of the New Orleans city wharves in 1858, caused by the Bell crevasse, just above the city limits), and it is doubtless an effect attending all crevasses and which will attend all outlets, should the folly of making, or attempting to make, them be committed."

Mr. G. W. R. Bayley appends, in a note to General Barnard's paper, the following statement:

"Soundings taken by A. S. Phelps, in 1856, across the Mississippi River, opposite the upper line of New Orleans, establish the fact that 120 feet was the maximum river depth then at that point. Again, in February, 1859, Messrs. Phelps and D'Hemecourt sounded the river carefully at the same place, and found the maximum depth to be 78 feet. The Bell crevasse, about 2 miles above, occurred on the 11th of April, 1858, and gradually enlarged until its discharge exceeded 100,000 cubic feet per second,

or fully equal to one-tenth of the river's discharge. The Labranche crevasse occurred on the 4th of May, 1858, and gradually enlarged until its discharge was 40,000 cubic feet per second, or about one-twenty-fifth of the river's discharge. This crevasse was also on the right bank and something over 20 miles above Bell's. The river depth in February, 1859, below both of these crevasses, and before the river had again risen to its ordinary high-water mark, was ascertained to be 42 feet less than in 1856, and, beyond question, the diminution was caused by the two great outlets of 1858. Mr. Phelps, and, indeed, many others, confirm my own observations that no appreciable reduction of the river's surface opposite New Orleans resulted, until June or July, and that then even it was barely perceptible, though undoubtedly real. * * * Last year, 1858, Vicksburg was (as also this year) below and in the midst of numberless outlets. The result was that on the 26th of April, 1859, the river there was 20½ inches above 1858, 18¼ inches above 1850, and 16 inches above 1828, notwithstanding that the water at Memphis, at its highest, was 5 inches below 1858. On the same day, April 26, 1859, the river at Baton Rouge was 4¾ inches below 1851, 3¼ inches below 1858, and at its highest mark up to that date for 1859; while at New Orleans, below the great outlets of last year, it was 3½ inches above 1858, and about 6 inches above 1828."

General Barnard again:

"The idea that levees have any tendency to cause a rising of the bed is so simply absurd, so destitute of a single reason to justify it that it hardly seems necessary to allude to it. It is the want of levees, and that alone, which can cause such a rising. It is this which is causing the remarkable rising in the lower and unleveed, and recently and inadequately leveed parts of the Lafourche; and in proportion as the water is let out from its confinement *by levees*, by means of crevasses or outlets, will the bed of the Mississippi be elevated."

Reference has heretofore been made to Mr. Bayley's paper before the American Society of Civil Engineers on this subject, and on the evidence of the stability of the flood plane both under the absence and existence of levees. The record of this at Natchez is also plotted as Fig. 1, of Plate 3, accompanying.

Testimony of the effect of the conservation of flood waters upon some of the streams flowing into or from the Mississippi is as follows: Bayley says, in 1857, of the Atchafalaya:

"Red River has been gradually turning down the Atchafalaya, adding more water to it, year by year; nearly every one of its outlets have been closed, its water has been concentrated, and its bed and surface are now lower by some feet than they were ten years ago. Lands on its borders which were swamps ten years ago are now cultivated and above the reach of high water."

Of the same stream, Caldwell writes, in 1858:

"As an evidence of the wonderful effect of this increase of velocity, I will here state that under my official supervision, both as engineer and subsequently as Commissioner, and by the authority of the legislature, since 1852 I have closed outlet bayous on the Atchafalaya River, of capacity amounting in aggregate to more than the capacity of that river, and yet the lands on Alabama Island (52 miles down) during the past season of extraordinary high-water have had higher banks than ever before known. At the same time the formidable rafts which formerly encumbered this noble stream have been swept away, the bed of the river deepened, and its general capacity increased."

Leavenworth, United States assistant engineer, reports, in 1875:

"The lands on either bank below the head of Bayou De Glaizes, being protected by substantial levees, are in a high state of cultivation as far down as Cow Head Bayou, in the thirty-ninth mile, below which there are no reliable levees. Some of the bayous closed by the State in this line of levees were wide, and capable of carrying an immense amount of water. Turner's Harvey's, Current, and three smaller ones, closed in 1870, have an aggregate section of 35,650 feet. The closing of these outlet bayous, thirty-seven in number, on either side has caused the river to scour its bed, deepening and widening it everywhere. The process has been gradual, and the levees constitute the third system that has partially survived the caving of the banks, consequent upon the increased slope and velocity of current."

A comparison is plotted (as Figs. 2 and 3, Plate 3) of the gauge record at Natchez, 70 miles above Red River, and of the gauge records at its mouth, and at Baton Rouge, 70 miles below, to establish that the increase of the outlet down the Atchafalaya has not operated as a relief to the Mississippi, although in the period embraced in these records the capacity of discharge has increased probably at least 150,000 cubic feet per second.

Of the Red River, Bayley says, in 1857:

"Wherever rafts did or do now occur, forcing the water to take lateral outlets, or wherever the water is divided, there and always there, on Red River, do we find the bed and surface raised many feet above the natural slope of Red River Valley. Caddo prairie, once in cultivation, was thus converted into a swamp. So occurred all the lakes bordering upon Red River; for as the bed and surface of the main river were

elevated above the old valley, so was the water precipitated right and left, converting lands, once comparatively high, into swamp and lakes. Everywhere on Red River where the waters are concentrated, as opposite Shreveport, Gand Ecore, from Cotile to and below Alexandria, there do we find the banks above overflow or nearly so."

The operations of Major Benyaurd, United States Engineers, at Tone's Bayou, and the experience and testimony of those familiar with the history of navigation of Red River, furnish further evidence of this statement.

Of the Lafourche, Bayley says, in 1857:

"From its head to Lockport, some 65 miles, the bayou was leveed some forty years ago. From Lockport to the Gulf of Mexico it was not leveed, nor is it yet to any useful extent or purpose. From Lockport to the Gulf the waters of the Lafourche had outlets everywhere, was free, and is yet, to discharge itself laterally, and the effect has been to contract its channel one-third or one-fourth of that above (where the water is confined) *and to elevate its surface some* 12 *feet above where the outlets occur. Where the water is confined by levees* its bed has *not* been filled up to any appreciable extent. The elevation of the surface of Bayou Lafourche *takes place where the outlets occur*, but the elevation here obstructs the discharge, backs up the water for a considerable distance, and thus causes an increased elevation of the water-line above. This is increasing every year. And as the increase is nothing at its head, of course, in order to retain the lands in cultivation between these two points the levees between Donaldsonville and Lockport must be made higher and higher every year. This addition constantly and regularly increases as you descend the bayou. This, perhaps, will be appreciated when we say that although the high-water of January this year (1858) was 5 feet 2¼ inches lower at Baton Rouge than in 1851, yet it was higher on Lower Lafourche than ever before."

Capt. T. P. Leathers, testifying before a committee of Congress, states:

"I came on the river in 1836. The river was very low that year. The average depth of water on the shoalest bars from the mouth of the Ohio to the mouth of the Arkansas, a distance of about 450 miles, was about 4 feet. From mouth of Arkansas to mouth of Yazoo, about 225 miles, there was about 5 feet. From that to the mouth of Red River, about the same distance, the average depth on the shoaled bars was 7 feet. Below Red River levees had been built; I do not know how long; but thence to the gulf there was deep water.

"Then levees began to be built above Red River in the parishes of Concordia, Tensas, Madison, and Carroll, the result of which was that in 1857, a period of twenty-one years, while the river was 20 inches lower in its banks, there was not less than 8½ feet of water on the shoalest bars in the formerly unleveed district between the Red and Arkansas rivers, showing an increased depth of 4 feet scoured out by the current created by concentration of the water.

"I am convinced from my observations that if the levees were rebuilt and kept up on the low lands, the concentration of volume, and consequent accelerated current, would soon wash out a channel large and deep enough for any purposes of commercial navigation. I am thoroughly satisfied that in the last ten years the frequent breaks in the levees and crevasses, dispersing the water over the country and diminishing the current, have caused the river to begin to shoal again. It always shoals near these breaks, evidently in consequence of the slackened current and natural deposit of sediment on the bottom which follows.

"I am confident that the only way of deepening the channel and getting reliable navigation is to concentrate the current, and if the great river accommodates itself by scouring out the bottom there will be no necessity for higher barriers at the top, and the levees will become more solid and reliable because relieved in a measure from the great pressure to which they are subjected."

Capt. J. A. Aiken, president of the New Orleans & Red River Transportation Company, also states before the same committee:

"Red River from Shreveport, La., to its mouth, distance about 500 miles, was, previous to the building of levees along its banks, a shoal stream, having a rise and fall of 8 to 12 feet, overflowing its banks during every high-water and inundating the country for miles on either side. As the country became settled, the planters built levees to protect their lands from the annual overflows.

"At about the year 1860 these levees, from Loggy Bayou to Alexandria, distance 220 miles, had become connected and continuous, presenting an unbroken line on each bank. It was soon found that the concentration of the water and increased current caused by the levees was washing out and lowering the bed of the river, and the effect has been so great that along this section of the river the rise and fall is now as much as 25 to 30 feet, and the lands have not been inundated for years. There are levees standing to-day 4 feet high above their base, that the highest floods have not touched for years. Since the war the levees have been extended above Loggy Bayou to Robinson's, distance about 12 miles, and the same deepening or lowering of the river-bed has been the result.

"From Robinson's to Shreveport, distance about 90 miles, there are outlets on either

side; the levees are not continuous and connected as they were below; the lands still overflow, and the river is gradually shoaling. Below Alexandria the river is in about the same condition as when first navigated by steamboats; namely, no perfect system of levees, no lowering of its bed; open outlets and annual overflows.

"Red River runs its entire course below Shreveport through alluvial soil, similar in all respects to that of the Mississippi. There can be no disputing the facts as to the Red River levees having lowered the river-bed, and deepened the channel, as above described. There are thousands of people living on its banks to testify to the truth of this statement, and as the Mississippi and Red rivers are similar in all respects, except as to the volume of their waters, it seems reasonable to expect that a perfect system of levees on the Mississippi would deepen that river and improve its navigation. In fact, it is known to old Mississippi steamboatmen that the permanent depth of water on the shoalest bars had been increased by several feet along the sections of that river that had been leveed, and that since the breaking of the levees thisdeepening process has ceased. It is also known to them that bars form opposite, and the river shoals below any permanent break or crevasse in a levee.

"As to the effect of jetties on river bars, we state that Snaggy Point Bar, on Red River, 75 miles above its mouth, and Alexandria Bar, 3 miles below the town of that name, had always, until recently, been almost impassable obstructions to boats in low-water, seldom in these seasons having depths over them of more than 15 to 24 inches. During the low-water season of 1876, the New Orleans & Red River Transportation Company placed jetties made of willow mattresses on Snaggy, and in less than fifty hours the depth of channel had increased from 20 inches to 5½ feet. After the high-water of the following year had subsided, the jetties were found intact, and the channel so deep and well-defined, that not a single boat had a moments' detention at that place throughout the entire season (fall of 1877,) which was one of unusual low-water. During the fall of 1877, this same company placed jetties on Alexandria Bar, when there was but 16 inches water, and boats had, after putting off all cargo, found it impossible to pull over. The channel immediately deepened, and although the river continued to fall for several weeks afterward, there was at no time throughout the season less than 4½ to 5 feet water. Freight charges by the boats were lowered one-third, at once, in consequence of this improvement."

The subsequent histories of these streams have amply vindicated the correctness of the foregoing statements.

B. M. HARROD.
CHAS. R. SUTER.

APPENDIX G.

REPORT OF COMMITTEE ON THE RED AND ATCHAFALAYA RIVERS.

OFFICE MISSISSIPPI RIVER COMMISSION,
Saint Louis, September 14, 1881.

SIR: Your committee on the Red and Atchafalaya rivers have the honor to report.

The region drained by the Atchafalaya River is of peculiar interest, from physical changes already accomplished, and others still in progress, and from the exceeding importance of the results apparently involved in some of these changes.

In an appendix, published with the last report of the commission, reference was made to the condition of affairs in Old River, resulting from the cut-off of 1831. We now beg leave to consider more fully the condition and tendency of the physical questions presented as they approach solution.

For the better understanding of this description of a now unfamiliar region, a map is herewith submitted. It may be regarded as extending from the highest prairies on the west of Bayou Teche to the alluvial slope of the Mississippi, and from the Red River to the Gulf of Mexico. It slopes both to the south and east, resulting in a double system of drainage; to the south, mainly through the Atchafalaya, Boeuf, and Teche, and to the east through lower Red River, and Bayous Lamourie, Huffpower, De Glaize, Rouge, and Courtableau. It is generally true that the more westerly of these water-courses are in a state of decadence, while the easterly are increasing. Through all, the distinctive soil-marks of Red River are clearly traceable, showing that, at different times, their beds and banks have been formed by the deposits of that stream.

The present banks and regimen indicate different ages. The Teche having high and wide alluvial margins, while the stream itself is greatly reduced, rising only 7 or 8 feet, under the exclusive influence of local drainage. On the other hand, the strips of high banks to the Atchafalaya are narrow, and confined principally to the upper parts of the stream, below Churchville, say 40 miles from its head, being comparatively and generally low. On this stream the deposit of red soil, indicating

the presence of Red River water, is also mainly on the upper part, and on the right or west bank. It is not as distinct as on the Boeuf, Huffpower, Teche, or Rouge, nor greater than could be accounted for by Red River overflows since the silting up of its more westerly and higher outlets.

The former relations of these streams to each other is of such interest as to have caused much study and discussion.

From the evidences of greater age and early dimensions of the more westerly streams, and of the more marked presence of the distinctive Red River deposit, from the measured agreement in width between the Teche and the Red River, and from the apparently persistent efforts of the westerly streams to establish easterly outlets, seeking drainage lines lower down the slope, it seems probable that the Robert, Boeuf, and Teche Bayous at one time constituted the main continuation of Red River; that the Atchafalaya was the lower trunk of the Ouachita and Black rivers, a clear-water stream, and that the lower Red River from Alexandria to the mouth of Black River, together with the Huffpower, De Glaize, Rouge, and Courtableau, streams having similar characteristics of direction and formation, were formed by the breaking through or overflow of former channels endeavoring to reach the lower grades of the eastern part of the valley.

The process which has been and is going on in Red River would exemplify the cause of these breaks. The numerous lateral channels of that stream, as Bayou Pierre, Tone's Bayou, Coushatta Chute, Cane River, and others, were formed by the effort to flank the obstruction of the raft moving steadily upstream by accretion at the head and decay at the foot. When the valley is inclosed by higher lands the outlets above would be returned below the rafts. In the absence of hills the course of the outlets under consideration is readily accounted for.

It is to be expected that outlets or overflow coulees, with a general slope of the land in their favor, and a large stream to receive the discharge, would form permanent channels.

We give extracts, in sequence of date, from the early history of Louisiana, descriptive of the condition of the Atchafalaya at the times.

Pittman says, in 1770: "From the River Rouge to the sea there are only some small brooks of no account. The Bayou Pelousas, which is about 3 miles from the river Rouge, and the river Iberville, are described in the account hereafter given of the settlements on the Mississippi." This promise is kept in the following lines:

"The small river of Pelousas is 10 leagues above the settlement of Pointe Coupée and 1 league below the mouth of the river Rouge. It receives its name from the natives and its water from a lake which lies about 40 leagues southwest of the place where it empties itself into the Mississippi."

Darby, in his Geographical Description of Louisiana, states: "The Atchafalaya was first obstructed by timber in 1778." In Ellicott's journal we find that "this branch (the Chafalia), notwithstanding its magnitude, is not navigable to the Gulf of Mexico, owing to the immense floating bridge or raft across it, of many leagues in length, and so firm and compact in some places that horses and cattle are driven over on it. This surprising bridge or raft is constantly augmenting by the trees and rubbish which the Chafalia draws out of the Mississippi."

Major Stoddart took possession of Upper Louisiana in 1804, under the treaty of cession. He was stationed about five years on the Lower Mississippi, and six months on the Red River. He stated that "the channel of the Chafalia, a few miles only from the head of it, is completely obstructed by logs and other material. Were it not for these obstructions, the probability is that the Mississippi would soon find a much nearer way to the Gulf than at present, particularly as it manifests a constant inclination to vary its course."

And again, "This outlet (Chafalia), in leaving the Mississippi about 3 miles below Red River, is nearly 200 yards wide. In low-water it is about 18 feet, and in high-water about 30 feet in depth. Thirty miles from the Mississippi it is obstructed by a raft of wood, bound together by a heterogeneous mixture of ligneous and other matter. In the course of 20 miles the navigation is choked by ten or twelve similar rafts, and it is calculated that the aggregate obstruction occasioned by them is not less than 9 miles. Some of them form good bridges, and are passable at all seasons. Many of them are covered with willow trees, and a considerable portion of them are 10 inches in diameter. These rafts rise and fall with the water, and are therefore justly termed floating bridges. Below the rafts the Chafalia affords a beautiful sheet of water at least as far down as Cow Island, from 75 to 150 yards wide, and from 25 to 30 feet deep in the dry season. The current of the Chafalia is quite gentle, till it is joined by the Plaquemine, 160 miles from the outlet of the Mississippi, when its velocity is considerably increased."

Finally, Darby writes in 1817:

"On the subsiding of the spring floods, I have seen the water flowing from the Atchafalaya into the Mississippi. This circumstance is very contrary to the common opinion on the subject, but it is true. I was witness to the effect in the fall season of three years ago. Indeed, so completely is the communication cut off at low-water between

the two rivers, that very often a common canoe cannot be taken from one to the other."

Soon after 1840, the removal of the rafts was undertaken by the State of Louisiana. This work was steadily prosecuted until the war, and was so far successful in the Upper Atchafalaya, that only parts of some of the rafts remain, the most important being near Bayou Courant, 30 miles, and above Churchville, 34 miles below the head of the river.

The present condition of the stream, relative to past surveys, will be discussed hereafter from information secured by the examinations of H. C. Collins, assistant engineer under Maj. C. W. Howell, United States Engineers, the last being made during the current year.

At the time of the early settlement of this region, immunity from overflow was secured to a very great extent by the high banks on the south or right side of Bayou De Glaize, and by the high western bank of Bayou Maringouin, probably a pass of the earlier delta, which discharges into the Atchafalaya below Cow Island. This trends the overflow to the westward, protecting the lands south and east.

Ordinarily overflows reached and poured into the river Atchafalaya above the Maringouin, in a direction athwart its southeasterly course below Whiskey Bay, and were either carried off by a series of outlet bayous in the south bank, as the "Nine Brothers of Tensas," or, if in sufficient volume, flowed in a sheet across the banks and bed on towards Lake Chicot and Grand Lake.

In the Atchafalaya, below the "Nine Brothers," there was seldom much current, and the water was comparatively clear. Only in very great floods in Red River, and their combination with a high stage in the Mississippi, by which the levees in Pointe Coupee were broken, was the natural protection afforded by the banks of the De Glaize and Maringouin insufficiant to avert general disaster, or was a greater volume precipitated than the Lower Alchafalaya and its intricate delta could vent.

Under these conditions, during the earlier settlement of the country, the Lower Atchafalaya region was quickly occupied, as a most fertile tract of land, with fair exemption from overflow; while at present agricultural occupation practically extends only about 40 miles down the head of the river, the mills and other buildings of abandoned sugar estates, with levees, fences, and furrows still traceable, are scattered through the second growth forest all the way down to the lakes.

Accompanying the development of this part of the State was a strong demand for navigation, making a market accessible to its expanding production. To satisfy this, the State of Louisiana undertook the removal of the raft which formed the principal obstructions.

This was sufficiently successful in that part of the river above the outlets, Nine Brothers of Tensas, and the junction of the Plaquemine. Through this stretch, a strong current prevailed, and the influx of draft was almost entirely stopped by the Red River cut-off. But below the point designated, the current was checked by the outlets on the south, and enormous masses of drift were floated in by the Plaquemine, which was not diked until 1865. In fact, at times the current was reversed above the Plaquemine, which sought partial discharge through the outlets above, instead of through the main trunk below; by which was established the most favorable conditions for the deposit of sediment and the formation of raft. Therefore, in the lower part, but little progress, and that not permament, was made in the removal of the rafts.

Immediately upon the removal of the obstructions from the upper part of the stream, its rapid enlargement commenced. Portions of the raft that had been left, as not endangering navigation, were washed out piecemeal, the bed was deepened, and heavy caving was started in the bends and on both sides of narrow reaches. Lands previously exempt from overflow were annually submerged by the increasing volume from above and the non-extension of proportional relief through the lower reaches of the stream.

First the profits and then the capital of the owners was absorbed in building and raising levees to restrain the augmenting floods from above, for which no adequate discharge below was provided.

Then followed general abandonment of this naturally favored region to the hunter and the raftsman. Now, throughout can be found the wreck of the appliance of industry and weath—ruined dwellings and sugar-house—broken levees, with recent water-marks high above their crests—fences, deeply imbedded in the deposit of many floods. The live oak and other forest trees, requiring the free exposure of their roots to the air, are smothered by sediment, while the cypress and the semi-aquatic growth of the swamp everywhere prevails.

In evidence of the enlargement of the Upper Atchafalaya we submit the well authenticated description of its condition in the early part of the century, given by the writers above quoted, as compared with the river to-day. This is well sustained by the testimony of the old residents. It is described as having then been shot-gun distance across, whereas now it is rifle distance. Its navigation now is excellent except from snags projecting from the banks and rafts—5 feet being always found

over the rafts, with 30 or 40 feet in the reaches and crossings, and frequently 100 feet and upwards in the bends. We also submit comparative profiles of all duplicated cross-sections (Plate 2), and a statement of the increase of section at the head, from different reports to the Chief of Engineers and other sources.

Authority.	Year.	Sect. area.	H. W. width.	Max. depth.	Increase.	Per ct. of increase.
		Square feet.	*Feet.*	*Feet.*		
Delta survey	1851	24,400	730	52	.....	.....
Delta survey	1859	28,700	830	63	4,300	.172
Major Howell:	1874	39,160	891	114	14,160	.605
Major Benyaurd	1879	52,100	940	130	27,700	1.134
Major Howell	1881	.....	.....	.....	.....	.....

Appended will also be found the comparative widths and depths found in the survey of Major Howell, United States Engineers, in 1874 and 1881, as far down as Butte la Rose. Mr. Collins, in immediate charge of the last survey, states that the demand for increased water-way is so imperious that the caving is not confined to the concave sides of bends, nor even to both sides of straight reaches, but that the points are being eroded, resulting in some cases in considerable straightening of the river.

In connection with this evidence we desire to direct your attention to the changes in the Upper Atchafalaya, under the influence of an increased volume, as a most marked instance of the adjustment of the bed of an alluvial stream to its discharge. The recorded increase of cross section at the head, between 1851 and 1870, is from 24,400 to 52,100 feet. The increase of discharge, estimated by the Board of Engineers, reporting on Major Benyaurd's report, between 1878 and 1879, is from 120,000 to 180,000 cubic feet per second. We believe it reasonable to estimate that the discharge of the Atchafalaya has trebled within forty-five years.

Besides this increase of discharge, levees have been built and outlets closed. These outlets, great in number and capacity, are thus described by Leavenworth in the report accompanying his survey of 1874:

"The land on either bank below the mouth of Bayou De Glaize, being protected by substantial levees, is in a high state of cultivation, as far down as Cow Head Bayou, in the thirty-ninth mile, below which there are no reliable levees. Some of the bayous closed by the State in this line of levees were wide and capable of carrying an immense amount of water. Tarner's, Harvey's, Current, and three smaller ones, closed in 1870, have an aggregate section of 35,650 feet. The closing of these outlet bayous, 37 in number on either side, has caused the river to scour its bed, deepening and widening it everywhere. The process has been gradual, and the present levees constitute the third system that has partially survived the caving of the banks consequent upon the increased slope and velocity of current."

Mr. Caldwell, engineer of this district of the State, reports in 1858:

"As an evidence of the wonderful effect of this increase of velocity, I will here state that, under my official supervision, both as engineer and subsequently as commissioner, and by authority of the legislature, I have, since 1852, closed outlet bayous on the Atchafalaya River, of capacity amounting in the aggregate to more than the capacity of that river, and yet the lands on Alabama Island (52 miles down) during the past season of extraordinary high-water, have had higher banks than ever before known. At the same time the formidable rafts, which formerly encumbered this noble stream, have been swept away, the bed of the river deepened, and its general capacity increased."

So, notwithstanding the increase of volume and the loss of outlet discharge, the flood elevation in this part of the river has not been raised. In the lower parts, where no conservation of discharge has effected by levees or the closing of outlets, the overflows have so increased as to force the abandonment of the country for farming purposes. We believe it is equally true that the increase of the Atchafalaya, as an outlet of the Mississippi, has not caused any reduction of the flood elevation of that river.

An examination of the records and discussions of great floods below Red River indicates that extreme height has only been attained when the Red River has added largely to the passing wave, and that, without important addition to that point, the river below has safely transmitted the volume from above. Also, that while the tributary (Red River) remained constant, or only affected by the better or worse condition of the levees on the north and east sides of the Tensas bottom, the steady increase of the outlet Atchafalaya has had no apparent effect of relief on the floods of the main stream.

In a discussion of the probable future changes in the Atchafalaya, as an outlet of the Mississippi, with a view to its proper control, the following consideration seems to be well established:

1. The distance to the sea by the Atchafalaya is 160 miles, and the average fall per

mile $3\frac{3}{8}$ inches. The distance by the Mississippi River is 327 miles, and the fall less than $1\frac{3}{4}$ inches per mile. This average slope of the Atchafalaya is exceeded in the upper and unobstructed part of the river, and at Butte la Rose, seven-sixteenths of the way down, four-ninths of the flood head is exhausted, the rise and fall there being about 20 feet. Below here the overflow is deep and general, reversing or disregarding the courses of the streams.

2. The flood and low-water grades of the Red and Atchafalaya rivers are below those of the Mississippi in the same latitude. The results of surveys are thus summed up by Duncan, State engineer of Louisiana:

"The section through Bayou Cut-off, made in November, 1857, gives the following water levels: High-water mark of Red River, 3.08 feet below that of the Mississippi. Low-water mark of Red River, 5.15 feet below the low-water marks of the Mississippi." This line is now being duplicated by Major Benyaurd, United States Engineer.

"A line run between the two rivers about two miles south of Bayou Cut-off gives the high-water mark of Red River 3.8 feet below that of the Mississippi."

"The high-water mark of the Atchafalaya is 14.1 feet below that of the Mississippi River, through the Tatenache section."

"The high-water mark at Indian Village (mouth of Plaquemine) is 20.2 feet below that of the Mississippi."

"There is no difference in the levels of the high-water marks of the Mississippi at Torras' and that at the mouth of Red River."

"The high-water mark at the head of the Atchafalaya is 0.17 feet below that of the Mississippi at Torras'."

3. Since the partial removal of the rafts, the cross-section and discharge has largely increased both from caving and scouring. This action is extending downwards, and is in operation now as far as Butte la Rose, 70 miles from the head, or nearly half-way to the sea.

4. The remaining parts of the raft are being washed out or flanked, which will still more increase the discharge. Mr. Collins, United States assistant engineer, in charge of surveys, considers that any flood may now carry away the last vestige.

5. The rafts now in the river act as dams, dividing it into pools and ripples. This is apparent in the slope profile of the late survey. When the rafts are entirely removed, the head in the pools will be drawn down, and the fall from the Mississippi to the Atchafalaya will be still more increased, resulting in greater velocity and enlargement.

6. The reclamation of the Tensas bottom by levees on the Mississippi will still further advance the flood elevation of the Red, and, consequently, of the Atchafalaya River. It can hardly be doubted that this great enterprise will be undertaken in the near future.

7. As the rafts in the Lower Atchafalaya receive no additions of fresh drift, except from the caving of its own banks, within a distance of 70 or 80 miles, it is probable that they may shortly decay and disappear, or new channels may be formed by the backing up of the increased volume of the river. It seems to us that this would certainly cause an increased slope and velocity in the lower reaches which would inevitably be transmitted above, to increase the draft of the head.

We cannot concur in the opinion of the Board of Engineers expressed in the review of Major Benyaurd's report (Report of Chief of Engineers, 1880, p. 1285), that "the fact that its lower course was choked more or less by drift logs has no important bearing upon its value as an outlet, because the flood water spread from the channel proper freely outward through the swamp-drains and over the banks, and thus reached the great basin level without seriously checking the current entering at the upper mouth." The backing up which we have stated to be caused by the drift dams, or rafts, certainly involved a loss of slope and velocity; and swamp-drains do not afford the same facility for discharge as clear and regulated channels.

8. The bar obstructions annually developed in Old River result from the feeble and vacillating character of the currents. The lowering of the Atchafalaya from the foregoing causes would fix the current already prevailing, from the Mississippi to the Atchafalaya, and increase its velocity. These obstructions would then no longer form, and the greater velocity would enlarge the outlet.

9. While these conditions all tend to divert a greater proportion of the discharge of the Mississippi into the Atchafalaya, we are aware of none that are adverse, or that can be expected to check or limit the enlargement of the outlet to the detriment of the parent stream, and the great interests dependent on the maintenance of its navigation, its port, and its free connection with the sea.

We believe that the premises give reason to apprehend the continued and rapid enlargement of the Atchafalaya, even to the extent of its becoming the main river, thus jeopardizing the commerce of the entire valley and the permanence of its port and outlet. The diversion of any large part of the Mississippi's discharge would tend to impair the navigation below and through the jetties, while the establishment of

favorable or even possible conditions of navigable outlet through the Atchafalaya and its shallow bay would be uncertain in result and time.

We therefore recommend that, at the earliest possible time a continuous brush sill be laid across Old River, between Turnbull's Island and the Mississippi, at such point as surveys show to be advisable, with the object of checking the enlargement of the outlet from the Mississippi at that point. This sill should have a base of not less than 200 feet, with a navigable channel over its crest of 5 by 204 feet at extreme low-water in the Mississippi. It should be continued up and for some distance on the bank, and be well secured throughout with ballast. The growth of willows on the upper part should be encouraged. The banks above and below the sill should also be protected against washing or caving.

We also recommend that the study of the subject be continued, in order to ascertain—

1. The expediency of completing the divorce of the two rivers. It was estimated by the Board of Engineers before mentioned that two years ago the capacity of discharge, in great floods, of the Atchafalaya was 82 per cent. of that of Red River. It is greater now.

2. Giving navigable access to the Atchafalaya, Teche, and Red Rivers through locks in Plaquemine.

It may be mentioned incidentally, under this head, that this connection would shorten the water route to Opelousas 124 miles, to the Teche 174 miles, and the mouth of Red River 15 miles.

3. The improvements needed for the navigation of the Plaquemine, and the Atchafalaya above its junction with that stream.

4. The improvements needed in the Atchafalaya, below the junction of the Plaquemine, for navigation, and to give vent to the increasing discharge from above.

Table of comparison of measured sections of the Atchafalaya from its head to Buffe la Rose (79 miles), taken in 1874 (by Leavenworth, U. S. assistant engineer), and in 1881 (by H. C. Collins, U. S. assistant engineer), under the direction of Maj. C. W. Howell, U. S. Engineers.

The distances of 1874 are stadia readings between stations on the bank; while those of 1881 are scaled ($\frac{1}{6000}$) between bank lines. The former distances are, therefore too great—giving a result, in widening, too small.

No. of section.	Width, 1874.	No. of section.	Width, 1881.	Change.	No. of section.	Width, 1874.	No. of section.	Width, 1881.	Change.
20	760	8	825	65	149	707	111	890	183
23	800	14	790	—10	151	785	116	870	85
25	1,002	5	1,070	68	155	895	119	910	15
27	820	2	830	10	163	720	132	760	40
30	778	19	950	172	164	873	136	880	7
36	1,120	26	1,240	120	166	800	142	910	110
38	992	27	1,030	38	170	625	151	685	60
40	930	28	950	20	171	716	154	780	64
43	1,113	29	1,160	47	173	700	155	860	260
47	818	31	900	82	184	668	168	830	162
48	796	33	880	84	185	712	171	740	28
52	1,100	34	1,140	40	192	569		660	91
57	957	37	1,070	113	194	745	180	990	245
60	858	38	1,020	162	200	475	187	540	65
65	1,383	41	1,230	—153	205	528	193	650	122
66	1,830	43	1,955	125	212	675	202	780	105
68	690	45	890	200	219	518	212	570	52
70	1,002	46	1,020	18	223	413	217	570	157
72	1,065	47	1,140	75	227	392	225	460	68
74	1,108	49	1,210	102	229	470	227	470	0
77	1,060		1,390	300	232	497	231	540	43
80	827	54	950	123	239	492	238	610	118
88	630	57	690	60	243	690	244	670	—20
97	787	60	840	53	248	340	257	460	120
99	1,650	61	1,630	—20	253	313		370	57
101	610	64	710	100	258	415	272	520	105
106	640	67	780	140	265	313	283	360	47
109	675	69	810	135	273	321	293	420	99
115	626	71	840	214	281	328	304	380	52
119	694	74	790	96	287	323	311	345	22
121	570	76	765	195	297	291		410	119
122	1,327	77	1,380	53	305	245	325	390	145
128	773	85	830	57	306	295	328	340	45
130	680	84	840	160	333	290	351	480	190
135	718	88	810	192	338	270	355	370	100
138	715	90	840	125	343	360		380	20
140	612		720	108	351	291	362	360	69
145	840	100	930	90	353	353	365	365	12
147	1,129	104	1,190	61					

The average widening is 65 feet in six years.

The average channel depths found by Mr. Leavenworth, whose survey "was made during time of high-water in the Mississippi and Red rivers," is 43.5 feet. The average of the maximum depths of Mr. Collins' cross-sections, corrected for high-water of 1874, is 58 feet.

We are under obligations to the United States engineers of the district, under Maj. C. W. Howell, for information.

Reports and discussions on this subject can be found throughout the reports of the State engineers of Louisiana, especially Louis Hebert and Duncan, 1859–'60, in the Reports of the Chief of Engineers for 1874 and 1880, and in the last report of this commission, 1880.

A map (Plate 1) and a sheet of comparative cross-sections (Plate 2) are herewith submitted.

Very respectfully,

CHAS. R. SUTER,
Major of Engineers, U. S. A.
B. M. HARROD.
HENRY MITCHELL,
Coast and Geodetic Survey.

General Q. A. GILLMORE,
President of Mississippi River Commission.

APPENDIX H.

REPORT OF THE COMMITTEE ON OUTLETS AND LEVEES UPON THE FLOODS OF THE MISSOURI RIVER IN THE SPRING OF 1881.

SAINT LOUIS, *October* 8, 1881.

SIR: The floods which occurred this spring on the Missouri River were of so anomalous a character and presented so many new and interesting features that we have thought it best to lay before the commission a statement and brief discussion of the facts pertaining thereto, as we believe they have a direct and important bearing upon the subject of river improvement, more especially with reference to the general question of the effect of levees and outlets.

The winter of 1880–'81 was of unprecedented severity and duration. The river was entirely closed in November, and at the lower end ice from two to three feet in thickness was formed. In the upper portions of the river it was much heavier, being from four to five feet thick at Vermillion and Sioux City.

Early in February mild weather set in on the eastern slopes of the Rocky Mountains, accompanied by melting of snows and breaking up of ice on the upper portion of the river. Farther east the weather was still cold and the ice unbroken. This first flood, therefore, spread over the bottoms and piled up the broken ice in great masses that soon consolidated and formed barriers across the valley, behind which the water ponded up, causing a general overflow of the valley, accompanied by great destruction to life and property. About the same time, and from the same cause, a violent rise occurred in the Kaw or Kansas River. When this reached the Missouri its ice was broken up and was entirely cleared out to the Mississippi, which stream also broke up below the mouth of the Missouri. This rise was a short one and the ice above Kansas City remained intact. During February and March all the gauges were rising and falling, but this was due to water which got through the upper gorges and ran upon the surface of the still firm ice. Meanwhile the gorges above Sioux City broke, one after another as the season advanced, and the flood gradually moved down stream, breaking the ice and forming new gorges in its advance. In April the ice broke up at Sioux City and below, owing to the letting go of a gorge above that place, and at the same time all the western tributaries came out in flood. At Omaha, and for some distance below the Platte, the banks were under water, but the overflow was not extensive and the rise soon subsided. It culminated at Sioux City on the 7th of April and at Saint Charles on the 17th. About this latter date the last ice gorges were broken by floods from the northern tributaries and the last and greatest rise set in. This flood came entirely from above Sioux City, all tributaries below that point being low. It was all snow-water, there being no drift at Sioux City and but little sediment throughout its course.

As a rule, the spring rises on the Missouri are more or less similar in character to this one, except in magnitud, *i. e.*, they are head rises from above Sioux City, due to the breaking up of ice gorges, but are not often free from tributary complication. A diagram herewith gives the hydrographs for the spring flood of 1879, and may be compared with that giving the various floods of 1881. Of these, it is only proposed to study the last, as the

earlier ones were complicated by the accession of tributaries in flood, and by the breaking up of very heavy ice. The one before the last was, however, a great flood, reaching at Saint Charles an elevation only about one foot less than the ordinary June rise. It caused considerable overflow between Sioux City and Omaha, and at the latter place was considerably above ordinary high-water. Below there the banks were only overflowed in a few places, where unusually low, as in the neighborhood of Plattsmouth, Nebraska City, and Brownville. The influx of the Platte and Kaw are plainly shown on the hydrographs from Plattsmouth and Kansas City. From Saint Joseph down the river was within its banks throughout, and the channel was fully prepared for any ordinary flood which might follow.

The extraordinary height of the second April flood would have rendered accurate observations of great value and interest, but it was not possible to make them owing to the general overflow and to lack of preparation. Since then all possible information has been collected on the subject and has been used in preparing this report.

We inclose herewith—

Diagram 1, showing hydrographs in 1881.

Diagram 2, showing hydrograph in 1879.

Diagram 3, curves showing rates of travel of crests of various rises.

Diagram 4, curves showing rates of travel of crests of various rises.

Diagram 5, curves showing relation of heights on Sioux City gauge to time of travel of crest of rise to various places below.

Diagram 6, showing widths of valley between bluffs.

Table A, giving the elements of the rise of April 23, 1881.

Table B, giving heights of rises of April 7 and 23 above low-water plane of 1880, and their differences.

Table C, giving gauge readings for various low-water planes and their differences.

The main facts concerning the overflow are as follows:

From Sioux City to a point below Glasgow the valley was submerged, essentially, from bluff to bluff. Between Sioux City and Omaha, between Platsmouth and White Cloud, and between Kansas City and Glasgow, where the valley is much above the average width, the overflow was not very deep, but much of the water flowed off through sloughs and low portions of the valley, and did not pass the gauges at all. Near Omaha, from Saint Joseph to Kansas City, and from Glasgow down, the valley is narrow. In the two first mentioned portions the overflow was deep, and the bed proper was disregarded, the river flowing down the center of the valley. Near Glasgow the same was true to a great extent, but between that point and Cedar City the river got within its banks, and from there down there was no overflow of any consequence and no diversion of water from the bed proper. This latter was quite generally silted up, at least we can infer so from the deposits, from 6 to 12 feet in depth, which were afterwards noted on islands and bars which were sheltered from the fierce current which set up when the river returned within its banks. The deposits on the bottom lands were enormous in quantity and extent, the immediate banks being raised for long distances from 4 to 6 feet. This afforded a very interesting exemplification of the manner in which the banks of silt-bearing streams are raised above the general level of the country. From Omaha, Saint Joseph, Kansas City, and Glasgow, reports were received that after the river got out of its banks the rate of rise increased, while the current was so materially slackened in the course of a few hours that skiffs could row about with ease, although before the river left its banks and after it returned to them the current was so strong that even steamboats were unable to stem it.

An examination of Diagram 1 and Table A will show that the crest of this flood was greatly retarded, that is, that the front of the wave lengthened out, while the rear shortened up. At the same time, the total length of the wave from valley to valley remained almost constant, but the crest was shifted from front to rear in its progress down the valley. This is precisely the opposite of what generally holds, as shown by the hydrographs on diagram 2, and of what might be expected on general principles; for it has been shown by all gauging observations, that, given conditions of unobstructed flow, as the surface rises the sectional area, mean velocity, and therefore the discharge increase at a rate, which is commensurable with the increase of gauge height. As the water surface rises, the velocity increases, and the mass of water, moving forward more rapidly, tends to overtake, and run upon that which has preceded it, so that the crest advances more rapidly than the front of the wave, and the front slope steepens. The reverse occurs on the rear slope, and these facts furnish a probable explanation of the smaller discharge, for an equal gauge-height, that is generally noted on a falling, as against a rising river.

The greatest rises heretofore observed were about seven feet lower at Sioux City than the one under consideration. Their crests took from six to seven days to reach Saint Charles, while this one took twelve days. The rise of April 7 took two and a half days less, or nine and a half days in all, and was 1.8 feet lower at Sioux City than that of April 22. Another rise, 16½ feet less at Sioux City, took ten days to reach St. Charles. Diagrams 3, 4, and 5 give all known facts bearing on this subject

and show, that up to a height on the Sioux City gauge of 95.5 feet, the rapidity of travel of crests increases. Only two rises have passed beyond this height, or above the limit of overflow, about 99 feet, and both of these were greatly retarded as shown.

The next point to be considered is the absolute height attained by this flood on the different gauges.

It is of course sufficiently obvious, that if a certain definite amount of water passes from one end to the other of a river, it should raise the surface at the lower to a less extent than at the upper end, owing to the greater size and efficiency of the section found there. Table B gives the absolute heights above the low-water plane of 1880 for the two floods of April, 1881 and their differences. From this it will be seen that the flood of April 7, though largely re-enforced by the Platte, the Kaw, and all the southern tributaries was at Saint Charles one-tenth of a foot below its initial height, while the flood of April 23, starting 1.8 feet higher than its predecessor, and receiving no contributions on the way, surpassed it 5 feet at Saint Charles, being at the same time 3.2 feet above its initial height. It is therefore obvious that the height reached by this flood was abnormal, and not to be accounted for solely by the volume of water.

Another line of evidence leads to the same conclusion. In 1878 and 1879 gaugings were made at various points along the river, those at Saint Charles being very complete. From these measured discharges curves were constructed, from which the discharge for different gauge-heights can be obtained. Now, at Saint Charles the river did not go beyond the limits of the old discharge section, and hence the actual volume of water which passed out of the river is pretty well known. This amount could not have been less than that which passed Sioux City, but should have been considerably greater. Nevertheless, this amount of water could not, according to the curves, have brought the water-surface at the upper gauges within 7 or 8 feet of the height actually reached.

Now it is, we think, obvious that these extraordinary results can only be explained by the fact that the river was out of its banks. It was practically transferred from its normal section to one of small depth, but miles in width. The slope was about doubled, but this was not enough to offset the immense increase of frictional resistance. Consequently the freedom of flow was so greatly checked that the water in rear piled up on that in front and produced the abnormal rise.

The width of the valley overflowed seems to have been an important factor in the case, as might indeed have been expected, for the greater the width the less the depth, and as the slope meanwhile remained practically unchanged the greater should be the resistance and the retardation of flow. An examination of Diagram 4 shows that this retardation was mainly concentrated between Sioux City and Omaha, Plattsmouth and Saint Joseph, Kansas City and Glasgow, where the valley is much above the average width. In the narrower portions of the valley the rate of travel of crest was about normal. In studying the diagrams submitted, it should be remembered that the exact determination of the position of the crest is impossible to within twelve hours, the interval between the daily readings.

Summing up the facts thus presented, it appears that the resistance to a free discharge of this flood, caused by the general overflow of the river banks, brought about an abnormal flood-height to the extent probably of from 5 to 8 feet. This resistance was mainly due to the increased width of the section of discharge, and, as the converse of the proposition is true, it follows, that if the banks had been high enough to prevent this overflow, the water-surface would not have risen as high as it did by many feet. Hence, if the flood had been restrained by levees where necessary, and, still better, if the high-water section had been reduced to any approximately uniform and suitable width, the water-surface would nowhere have surpassed, and would generally have fallen much below, the level of the present banks.

In conclusion, it should be stated that the height attained at Saint Charles was abnormal, although the banks were out of water for some distance above. This was due to the fact that the water had been so much retarded above, that the bulk of it came down like a second rise. Had the flow been distributed as it would have been under ordinary conditions, the rise at that point would have been very much less, as the total volume of water passed was only about two-thirds that of the ordinary June rise, which passes with a crest about 4 feet lower than this one.

Any fill which took place in the bed proper during the overflow was pretty much scoured out on the falling stage, after the river got within its banks again. From all points it was reported that, during this period, the force and velocity of the current were extraordinary. Bars, which had been permanent fixtures for years, were removed and a general deepening was noticed on all sounded sections. But on islands and bars which were sheltered from this great scour, the depth of the deposits gives sufficient evidence of the extent to which fill took place during the overflow. It was thought that the effect of the flood would be to leave permanent deposits which would affect the low-water plane, but such does not seem to have been the case. Table C gives the gauge-readings of the low-water planes of four successive years and their

differences. From this it will be seen that there are quite as great irregularities of profile evinced on the records of the other seasons as appear in that of 1881.

Another evidence of the extraordinary rapidity with which the Missouri readjusts itself is afforded by the Omaha hydrograph. Just after the crest of the flood of April 23, a cut-off occurred, some 8 miles below the gauge, which shortened the river 5 or 6 miles. The effect of this is shown on the falling stage, the fall being about three feet more than would otherwise have been the case; still, at low-water of this year, no depression is noted on the gauge, the low-water plane remaining substantially at the same elevation as in previous years.

Respectfully submitted,

B. M. HARROD.
CHAS. R. SUTER.

General Q. A. GILLMORE,
President Mississippi River Commission.

TABLE A.—*Elements of the rise of April* 23, 1881.

Location of gauge.	Distance from mouth.	Length from valley to crest.	Length of crest.	Length from crest to valley.	Length from crest to initial height.	Length from valley to valley.	Length between equal gauge heights.	Rise.	Fall.	Remarks.	
	Miles.	*Days.*	*Days.*	*Days.*	*Days.*	*Days.*	*Days.*	*Feet.*	*Feet.*		
Sioux City	780	7	0	12	9	19	16	11.1	12.7		General overflow.
Omaha	639	7	1.5	11	4.5	19.5	13	8.7	12.8*		
Plattsmouth	621	8.5	0	11.5	7.5	20	16	8.2	9.8	Wide valley, great deal of water did not pass the gauge; probably ran near east bluffs; gauge on west bluffs.	
Nebraska City	591	10	0	11	7	21	71	4.7	6.0		
Brownville	563	9.5	1	11	6.5	21.5	17	5.7	7.5		
White Cloud	515	11	0	10	5.5	21	16.5	6.2	9.0		
Saint Joseph	466	11.5	.5	9.5	6.25	21.5	18.25	8.4	10.0		
Atchison	434	11	1	9	5.25	21	17.25	7.5	10.2		
Leavenworth	405	11	.5	9.5	6.75	21	18.25	9.8	10.7		
Kansas City	375	11	1	9	5.25	21	17.25	9.2	10.8		
Lexington	310	12	.5	8.5	6	21	18.5	8.6	9.7		
Glasgow	222	13	0	7	5	20	18	8.5	10.9†		
Cedar City	145	13.5	.5	6.5	4.75	20.5	18.75	7.1	8.2	No general overflow.	
Saint Charles	26	13.5	1	5.5	4.75	20	19.25	8.0	8.6	No general overflow.	

* About 3 feet fall due to cut-off formed below gauge.
† End of general overflow between here and Cedar City.

TABLE B.—*Heights of rises of April* 7 *and* 23, 1881, *above the low-water plane of* 1880.

Location of gauge.	April 7.	April 23.	Difference.	Remarks.
	Feet.	*Feet.*	*Feet.*	
Sioux City	16.1	17.9	1.8	
Omaha	14.3	18.0	1.7	
Plattsmouth	13.0	15.4	2.4	
Nebraska City	10.0	11.6	1.6	
Brownville	12.3	15.0	2.7	
White Cloud	.....	.....	3.3	Low-water plane not established.
Saint Joseph	14.6	18.8	4.2	
Atchison	15.6	19.4	3.8	
Leavenworth	14.1	19.7	5.6	
Kansas City	16.7	21.9	5.2	
Lexington	14.8	20.3	5.5	
Glasgow	15.6	20.6	5.0	
Cedar City	14.2	18.4	4.2	
Saint Charles	16.0	21.0	5.0	

TABLE C.—*Gauge readings of low-water planes of various years.*

Location of gauge.	Low-water gauge reading.				Differences.					
	Nov. 10, 1878.	Oct. 31, 1879.	Nov. 6, 1880.	Sept. 5, 1881.	1878, 1879.	1878, 1880.	1878, 1881.	1879, 1880.	1879, 1881.	1880, 1881.
	Feet.	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*
Sioux City	84.2	83.4	84.5	85.3	—.8	.3	1.1	1.1	1.9	.8
Blair*	.....	.....	3.2	.....	.....	.....	.....	.....	.....	.....
Decatur*	.....	.....	5.2	2.6	.....	.....	.....	.....	.....	—2.6
Omaha	5.8	5.6	5.8	6.1	—.2	.0	.3	.2	.5	.3
Plattsmouth	3.3	2.5	3.9	4.5	—.8	.6	1.2	1.4	2.0	.6
Nebraska City	4.5	3.9	4.3	5.0	—.6	—.2	.5	.4	1.1	.7
Brownville	.....	.....	9.1	10.1	.....	.....	.....	.....	.....	1.0
White Cloud	.....	.....	.....	6.2	.....	.....	.....	.....	.....	.....
Saint Joseph	5.1	2.6	3.9	4.1	—2.5	—1.2	—1.0	1.3	1.5	.2
			Nov. 8.							
Atchison	4.3	.....	4.0	4.5	.....	—.3	.2	.....	.....	.5
Leavenworth	5.6	.....	5.1	7.1	.....	—.5	1.5	.....	.....	2.0
		Nov. 6.								
Kansas City	5.4	4.7	5.6	6.7	—.7	.2	1.3	.9	2.0	1.1
Lexington	3.8	.....	2.8	3.6	.....	—1.0	—.2	.....	.....	.8
Glasgow	98.3	97.3	98.2	99.3	—1.0	—.1	1.0	.9	2.0	1.1
Cedar City	.....	.....	81.2	82.8	.....	.....	.....	.....	.....	1.6
Saint Charles	68.7	67.2	68.2	68.8	—1.5	—.5	.1	1.0	1.6	.6

APPENDIX J.

REPORT OF ASSISTANT ENGINEER E. H. WILSON, UPON THE RESULTS OF BORINGS AT MEMPHIS, TENNESSEE; HELENA, ARKANSAS; ARKANSAS CITY, ARKANSAS; GREENVILLE, MISSISSIPPI, AND LAKE PROVIDENCE, LOUISIANA, WITH DATA PERTAINING TO SIMILAR WORK PREVIOUSLY EXECUTED.

GRANTFORK, MADISON COUNTY, ILLINOIS, *June* 8, 1881.

LIEUTENANT: After some delay incurred in awaiting the completion of certain repairs and additions to the plant used in making borings, under the direction of Maj. Charles R. Suter, several members of the old boring party, Recorder Thomas Weir and myself, in compliance with your verbal instructions, left Saint Louis on December 21, 1879, for Mound City, Ill.

Loading the necessary boring equipment on the United States quarter-boat Arkansas, we floated to Cairo on the 24th, and two days thereafter entered a coal fleet, which landed the party below Memphis, Tenn., on the 28th of December.

Here, opposite the head of President's Island, boring No. 1 was undertaken.

The subsequent progress of the party is noted in the reports upon the borings now in your possession.

On the completion of the boring at Hays' Landing, Miss., the party was discharged, and the quarter-boat, with its equipment, towed to Hampton Landing, Ark., and there, on April 22, 1880, turned over to the watchman in charge of the fleet at that point.

As the party managed the quarter-boat between the borings without the assistance of steam-power, a table has been prepared showing the distribution of time from the date of departure from Mound City, Ill., to the time of disbandment at Hays' Landing, Miss., which may prove of some value as a basis of comparison of the relative costs of floating, towing, or other methods of moving.

In work of this sort but little time is absolutely lost when progress while *in transitu* is interrupted by inclement weather, as the time so afforded can be utilized in the care of specimens, repair and manufacture of tools, cutting and stowing of fuel, &c.

The work of the party is represented in the results of sixteen borings, aggregating 2,426 feet, which are scattered over a distance along the river of 350 miles.

The apparatus used in making these borings was essentially the same that was constructed under the direction of Major Suter by J. W. Nier in 1878, and was used in making similar investigations at New Madrid and Plum Point, on the Mississippi, and at Nebraska City, Nebr., on the Missouri River.

Its efficiency in making borings in the alluvial strata has been demonstrated by the fact that no alluvial deposit has been found too deep to penetrate. Its use permits the exact location of the layers. During the progress of the boring, every change, slight or great, was noted at the derrick, and specimens thereof were preserved.

After drying, these specimens were examined with a magnifying glass, the character of their differences noted, and the representative specimens bottled and labeled.

The report submitted to you, on the completion of each boring, is intended—

1st. To record the history of that boring; the time consumed in moving; the time lost by inclement weather; unusual mechanical difficulties overcome; unusual geological developments either in the alluvial or in the underlying Tertiary strata.

2d. The result of an examination of the specimens with a magnifying glass and the measurement of the size of the particles of sand on a micrometer scale.

With the glass used, a diameter of $\frac{1}{3000}$ of an inch could be recognized. In the reports, an average of the size of sand particles is noted, and also the largest observed diameters, the largest dimension of the particle being considered. Every alluvial layer found contained material of diameters less than could be measured with the glass used.

In this connection it should be stated that the estimates of three different observers, V. P. Primm, Thomas Weir, and myself, agreed closely in the estimates of the average sizes of sand particles, and, though not absolutely correct, of course, these size averages may, in the results of all the borings made with the apparatus, be safely used for purposes of comparison.

The party was provided with level and transit, and where located points of survey could be found the location of the boring was fixed, horizontally and vertically, in reference thereto.

Where survey points were wanting, the boring was referred to benches cut in roots of trees, which may hereafter be identified and located.

A sketch accompanies each report, which preserves these notes of location.

In these reports the division of sand from gravel has been arbitrarily fixed at twenty diameters to an inch.

A limit of size of particles, however, could not be applied in distinguishing sands from clays.

The name of clay, as applied to most of the observed alluvial deposits of fine silt, is a misnomer, few such deposits bearing a sufficient quantity of alumina to be properly so called. This term has been used, however, in the popular sense, to designate those deposits of silt which, on account of their coherence, due to the presence of alumina, would not, examined superficially, be pronounced sand.

With this as a controlling distinction we may have comparatively coarse siliceous sand, which carries considerable alumina as a cementing material, classed among the alluvial clays, while more finely comminuted material without the alumina is called simply sand.

Fine clean sands of 300 diameters to the inch are rarely found in the alluvion, however, and, generally speaking, the fineness of the clays is directly proportional to the fineness of comminution of the siliceous material of which they are principally composed. In brief, that alluvial material which would oppose any considerable resistance to erosion has been termed clay.

The alluvium of the Mississippi River below Cairo occupies a huge trough carved out of the soft Eocene Tertiary layers, and is bounded on either side by the loess-capped bluffs which on the west mark Crowley's Ridge.

West of this long, narrow ridge, entending, though with several breaks, southward from Commerce, Mo., to Helena, is another alluvial region of an extent nearly equal to that of the Mississippi, whose basin, through which now wind insignificant streams, with small drainage areas, was probably excavated by the floods to which are due the erosion of the present valley of the Mississippi.

This alluvium consists of clays, sands, and gravel, all largely siliceous.

Generally speaking, the coarseness of the material increases with the descent from the surface, but the departures from this rule are frequent.

Deep-seated alluvial clay beds are rare, and when occasionally found were probably often deposited by eddying waters.

The lenticular masses and the irregular and extensive clay beds seen in the bluffs in the orange sand deposit, were found amidst swiftly running waters, and their study indicates the probable character as to extent of most of these lower clays found in the alluvial gravel-beds.

There has been no slow and gradual building up of these lower alluvial layers, and changes in the surface elevations as due to fluviatile agencies have been apparently continuous and positive, though not very great in amount, as is judged from the fact that deeply seated extensive clay layers are rare, and when found, are wanting in traces of vegetable growth, and furthermore, that the observed beds of vegetation are not much if any deeper than the low-water stages of the modern river permits upon its bars.

Remains of trees in their original vertical position are frequently seen beneath the surface in a cutting bank; but forests may still be found growing at points in the river bottom, remote from the present river channel, at the same or lesser elevations.

Sticks and logs are often found deeply buried, but the usual absence of bark thereon, and their location in sand and gravel beds, shows their drift origin. The fiber of these logs and sticks is generally well preserved, and though often spongy is rarely rotten. Fossil shell remains have been rare, and when found, with one or two exceptions, in all the alluvial borings, have been near the surface of the ground, never beneath the elevation of the surface of water in the low stages of the river.

SURFACE CLAYS.

The surface clay beds vary greatly in depth as is shown in the following table, which contains the results of the borings made by Major Suter in 1879, above Memphis. From the table are omitted, of course, the results of the borings made upon bars not built up to the general elevation of the bottoms; of borings made in the Tertiary deposits; of borings made in the older Quaternary deposits in the vicinity of New Madrid, Mo.

Locality.	Greatest depth or thickness of clayey beds.	Least thickness of clayey beds.	Number of units entering into the average.	Average thickness of clayey beds.
Nebraska City, Nebr	29.7	0.0	35	13.0
New Madrid, Mo	42.0	0.0	10	19.0
Plum Point, Tenn	44.0	0.0	29	21.0
Memphis, Tenn	22.7	18.6	2	20.7
Helena, Ark	.....	.....	1	28.0
Choctaw Bar, Ark	68.0	12.0	5	37.0
Greenville, Miss	.....	.....	1	2.4
Lake Providence, La	109.0	28.0	4	55.0

The general law is here disclosed (which seems almost patent), that the nearer the Gulf is approached the deeper are the surface silt deposits, the greater have been the changes in surface due to the action of fluviatile forces.

This would seem entirely reasonable as a theory at points nearing the delta, where the slope of the river has been decreased as its mouth extended into the Gulf; but the effect of decreased slope would not seem sufficient to so markedly influence the thickness of surface clays at points distant from the delta.

The conditions which would insure the greatest variation in thickness of these surface clay beds, that these borings have disclosed, prevail to this day along the river.

The clay beds are sometimes entirely wanting.

The preparation for this somewhat unusual feature of the alluvion may be seen at the head of island chutes, or at such points on bars over which the river in its higher stages maintains a swift current.

Such points may ultimately become the main bank when extreme high waters may finish the building process by the deposition of its coarser silt in the rapid currents passing over river banks during overflow.

The results of the boring seven miles below Greenville, Miss., showing but little surface clay, may be accounted for in this manner, as is suggested by the topographical features of the locality.

On the other hand, these clayey deposits may be of great depths, as at the foot of cut-off bends, where the deep trough has been filled slowly by the finer silt material.

The most notable instance of depositions under conditions of this sort distinctly traceable was shown by the results of the Lake Providence boring, No. 2, at the foot of the Lake of Providence. Here, for a depth of 109 feet, fine and sandy clays and clayey sands were found, separated from the Tertiary layers (marked by a bed of lignite in this instance) by a bed of unusually heavy gravel, the sand layers being entirely missing.

GRAVEL.

As might be expected, there is a decrease in the average size of gravel stones observed as the river is descended, but this shading is not very pronounced as far south as Lake Providence.

The difference in the sizes of the larger stones is not noticeable.

The borings below Memphis, as compared with those above that point, show fewer sand beds in which gravel is absent.

No difference in the material composing the gravel layers is observed along the Mississippi until we get below the mouth of the Arkansas, where many of the larger

pebbles are of slightly effervescing or of siliceous clay stones and of the white cherty material which is largely developed in the Subcarboniferous beds of Eastern Arkansas. (Owen.)

The greater proportion of the larger pebbles are of red and yellow jasper, brownstone, and chert.

Clay balls, of all degrees of induration, of alluvial and Tertiary material, and fragments of water-worn lignite are common in the gravel beds.

SANDS.

The sand beds intervene, as a rule, between the surface clays and the gravel layers. This sand is always siliceous and generally much water-worn.

The peculiar whitish-gray sand beds of the northern Lignitic group have never been found in the alluvial strata.

Mica is almost entirely wanting in the latter layers. Sharp building sands are rare.

DOMESTIC WATER SUPPLY.

The water gotten from wells throughout the alluvial regions is generally strongly impregnated with iron. On this account it is usually stated "that the nearer the surface water is obtained the better is its quality," the quality varying inversely as the amount of iron apparent to the taste.

It is needless to say that the converse of this is true as dependent upon the amount of vegetable impurities.

To the use of this water, saturated with decaying vegetable matter, must be attributed most of the malarial disorders of the inhabitants of the region.

To the unacclimated system, debilitated by the heat of this southern climate, these surface waters are astonishingly sure and speedy poisons.

While near New Madrid, in the summer of 1879, the health of the party was maintained while river water was used. The first day that the men rebelled against the use of the warm, muddy water of the Mississippi witnessed the complete prostration by malarial fevers of eight strong men.

Driven wells are ordinarily depended upon for the water supply, but the resistance of the alluvial material will not permit the driving of the pipe more than from 40 to 80 feet.

Well points attached to ¾-inch pipe have been dropped into several of the bore holes, in the vain hope that within the heavier gravel deposits, below the reach of the ordinary methods of sinking, a supply of pure water might be found; but in every case so tried the water obtained was so saturated with iron as to be far more unpalatable than a supply reached at lesser depths.

Crystals of iron pyrites occasionally found in the gravel beds—sometimes imbedded in the stones—indicate the source of the chalybeate qualities of the water.

GENERAL REMARKS.

The borings show the greatest diversities in adjacent deposits. Often, no doubt, stripping of the surface would disclose old shore-lines of the widely wandering river, which would account for the abruptly changed characteristics of the layers. The results of the two borings separated by an old shore-line, in the city of Providence, La., disclose differences clearly attributable to this cause. However, the uneven surface of a sand or gravel bar, which may shortly be attached to the main shore and hidden beneath the surface clays, shows differences almost foot by foot, and preparation for further differences in the materials of its final covering that are quite as pronounced as those disclosed by the borings.

The influence upon deposits of streams flowing into the Mississippi spoken of previously as affecting the character of the gravel found, is most noticeably shown in the color of their clays. Red tints—sometimes indistinct, occasionally brilliant—are found in the clay beds. These red tints and the whitish-yellow tints seen at Arkansas City (Choctaw Bar borings), were in no instance found above the mouth of the Arkansas River. West of Arkansas City for 25 miles the banks of the several bayous, running north and south, crossed by the Arkansas & Texas Railroad are composed of reddish clays.

These banks are generally above ordinary overflow, though they fall rapidly as the bayou is left, a familiar characteristic of the banks of silt-bearing streams.

As far as could be ascertained the wells of this region have never been sunk through the alluvium into the older deposits.

In this locality was noticed a somewhat unusual topographical feature. Pits and mounds, with differences of elevation as to bottom and top of about 4 feet, were scat-

tered thickly over quite an extensive area. The mound had always the same relative position to its pit. Chance pointed out the origin of this singular surface feature, which was usually pronounced unaccountable by the inhabitants.

Winds have prostrated immense trees; the roots torn from their anchorage, carried over masses of clinging earth and roots; and trunks decaying, left the pit and mound to mark the wreck.

PRE-ALLUVIAL LAYERS.

The bluffs on either side of the Mississippi below Cairo are composed at top of the Quaternary loess resting upon the orange sand (Hilgard) or bluff gravel (Safford), which in turn rests upon the Tertiary layers. The thickness of the loess varies continually, depending upon the elevation of the surface of the orange sand, as left by the glacial floods.

The thickness of the orange sand deposit, even at points nearly adjacent, also varies greatly, and depends not only upon the height at which its upper surface has been left by the subsidence of the glacial floods, but also upon the height of the upper surface of the underlying Tertiary formation, which had been at some points deeply furrowed by the glacial waters, whose central current plowed out the huge alluvial trough of the Mississippi.

The region between Cairo and the Gulf is underlaid by the Tertiary deposits, in which all the borings penetrating the alluvium have ended. The borings at New Madrid, Plum Point, and Memphis, discovered the northern Lignitic group (Hilgard.)

The lignite beds that were abundant at Plum Point were infrequently met with at New Madrid, and were entirely wanting at Memphis.

Opposite Helena, the boring, penetrating the alluvium, entered the Lignitic clays, but in the bluff boring back of Helena the first marine Tertiary strata were found; which, below Helena, prevailed as the underlying formation.

The difference in elevation of the top of this stratum and the bottom of the alluvium (in boring No. 1), which rested upon the Lignitic clays, was 150 feet. Though the thickness of the marine Tertiary formation at Helena was within this limit as a maximum, data for its exact determination could not be obtained.

Proceeding down the river the alluvium at Choctaw Bar and at Greenville is found to rest upon the marine Tertiary strata.

Borings Nos. 1 and 2 at Lake Providence disclosed the northern Lignitic formation immediately beneath the alluvium.

Boring No. 3 at Lake Providence discovered the marine Tertiary again, and here we were for the first time able to enter the conformable Lignitic layers (Northern Lignitic).

The Tertiary layers do not contain gravel (or rarely), so that in passing upon the age of any deposit below Cairo, this fact will always permit the easy separation of the Quaternary (both alluvial and pre-alluvial) from the Tertiary layers.

Many of the alluvial clays are not distinguishable from some of the Lignitic clays; the location of the gravel layers in reference to any given clay stratum, however, yields the solution oftentimes.

The reference of all the bluish clays to the Tertiary group has caused widely erroneous opinions of the geology of the river bottom to prevail.

The separation of the alluvial deposits of gravel and sand, and the Quaternary bluff gravel (Safford), or orange sand (Hilgard), is simple. Supposing that the peculiar colors of the latter formation would only appear on exposure to surface agencies (as is stated to be the case with the material of the La Grange group of the Tertiary by Safford); the presence or absence of the many lenticular or basin shaped deposits of whitish clay that are found throughout the orange sand deposit serve as a guide in distinguishing the groups.

It so happens that in the alluvial borings these clays are not found; so that the deposition of the sands and gravels of the alluvion, though similar in many respects to the material of the orange sand, must have taken place at a different period.

The application of the above train of reasoning to the results of the borings about New Madrid (made by Major Suter) shows that the high banks, far from marking Tertiary deposits, as has been sometimes supposed, cover the deepest alluvial beds found in the Mississippi bottoms.

The remains of vegetation in the clays near the surface indicates that the formation was certainly not built up as is the modern alluvion, and subsequently elevated by earthquake action.

To some fluviatile agency more powerful than that of the modern Mississippi, however, must this unique formation be attributed.

Professor Potter, of Washington University, has suggested, as a result of considerable study on the subject, that these high prairies were the sand-bars of the glacial stream.

Whatever the variations in the depth of the alluvion lying between the loess-capped bluffs bordering the Mississippi bottoms, it is yet to be proven that the Tertiary layers come to the surface at any point therein.

It is not believed that the wells sunk in the various low ridges throughout this immense region have ever reached this older formation.

Certainly, judging from the personally observed or recorded material passed through in sinking these shallow wells, the older strata have never been reached.

The study of the northern Lignitic formations in Mississippi by Hilgard did not disclose any westerly dip in its strata. His geological map of the State shows the fresh water deposit extending soutward along the river bluffs to within 20 miles of Vicksburg, where, with an abrupt dip southward, it disappears beneath the later marine Tertiary formation.

The strike of the latter deposit, as developed in Mississippi, is nearly east and west; so that without a westerly dip of the northern Lignitic, we should find the strata of the latter formation at the base of the alluvion in all the borings above Vicksburg. Such is not the case, however.

The bluff boring at Helena, and the alluvial borings at Choctaw Bar, Greenville, and Hays' Landing discovered the marine deposits, which are so shown to extend uninterruptedly to Helena, at least, and probably much further northward. Data are not at hand to determine the western boundary of this marine basin. Its eastern boundary lies between the bluffs and the river.

As the surface of this formation was subjected to the same eroding forces that furrowed through the older Tertiary formations in Mississippi, and subsequently covered the greater portion of that State with the sands and gravels of the orange sand, its original elevation cannot be determined. At Helena, as shown in the bluff boring, the upper surface of the formation is 12 feet, approximately, beneath the high-water of 1880.

The limit of its depth is between 65 feet, the actual depth to which it was penetrated, and 151 feet, at which depth the boring in the alluvion opposite encountered the materials of the northern Lignitic formation.

The Arkansas State geological report contains a section of the chalk bluffs of the Saint Francis River. These bluffs mark the southernmost gap in Crowley's Ridge, which extends under different names from Commerce, Mo., to Helena, Ark. In this section there is noticed beneath the orange sand a shallow bed of clay marl.

No description of its fossils is given, but as it rests upon clays that are apparently northern Lignitic, it is possible that this bed may be an extension northward of the clay marls we found at Helena.

At Gainesville, 30 miles southwest of the chalk bluffs, lignite beds, impressions of leaves, &c., are found; which, no doubt, are in the westerly extension of the similar beds found in Tennessee, and exposed in the bluffs at Forts Pillow and Randolph. This fact would seem to indicate a comparatively small width for the marine deposit, which would appear to have been a deep, narrow coast indentation.

The small size of the fossil marine shells indicates the periodic destruction of salt-water animals by northern fresh waters, before the glacial flood period.

South of Gainesville are beds of white quartzite, which are designated as "Silurian" protuberances in the Quaternary beds (Owen). (It would perhaps be well to state that the beds called "Tertiary" by Safford, Hilgard, and Dana are termed "Quartenary" by Owen.)

This "quartzite" is surrounded by loosely compacted sand-beds. It is inferred, from the fact that no mention is made of this extraordinary "Silurian outcrop" among the Tertiary beds elsewhere, that the peculiar deposit is due to the local induration of the white Tertiary sands which the New Madrid and Plum Point borings made familiar.

Very hard effervescing material in the marine beds prevented its penetration in the borings at Choctaw, Bar. At Meyersville, Miss., and at Lake Providence, La., the alluvium rested directly upon the northern Lignitic strata. At Hays' Landing, Miss., the alluvial layers rested upon the clay, shell, and green sand marls of the marine beds, and they rested, conformably, upon the northern Lignitic strata at a depth beneath the surface of high-water of 1880 of 150 feet.

It is possible, of course, that these Lignitic layers may not belong to the northern Lignitic group, but a comparison of the material of the Lignitic layers of the Lake Providence boring, which was penetrated to a depth of 120 feet, with that found in Tennessee strongly argues the propriety of referring these layers to the same Tertiary group, which, as Hilgard indicates, extends southward along the bluffs nearly to Vicksburg.

Some mention of the probable resistance to erosion and reliability for foundations of the various Tertiary strata found at the base of the alluvium in the Mississippi River borings would seem appropriate here.

The study of these formations elsewhere has shown a diversity in the materials of their beds that, on a much smaller scale, may be seen on the river bars; so that no reliance can be placed on the continuance of a certain bed, as discovered in a boring, any great distance in any direction.

About New Madrid and Plum Point the most stable material, judging from the degree of resistance offered to penetration by the boring tools, was the Lignite.

Some of the clays were also very hard and massy. The white-sand beds were so loosely compacted that no reliance could be placed upon their resistance to eroding forces.

Below Memphis (boring No. 2) some extraordinarily hard, stiff clay beds, popularly called "soapstone," were found, commencing about 90 feet beneath the high-water plane of 1880 (this in the bluff).

This material would successfully resist any eroding force that the current of the river now develops. The clayey, fossiliferous marls of the marine Tertiary groups are generally quite hard and massive. The shell and green-sand beds of this group usually contain considerable siliceous sand, and are quite friable.

At Helena (in bluffs), beneath stiff, marly clays, very hard, rocky material was encountered; whether layers or concretions of limestone could not be determined absolutely, though probably of concretionary origin.

The Choctaw Bar borings all discovered very stiff, marly clays at the bottom of the alluvium.

At Greenville the suballuvial layers of very friable shell and green-sand marls were found at the least depth beneath the surface, 88.4 feet, anywhere discovered.

At Meyersville, Miss., alternately stiff and sandy clays were found.

At Lake Providence, La., a bed of Lignite was found to have successfully resisted the valley eroding forces, but beneath this the beds became sandy.

At Hays' Landing shell marls were found, which offered more resistance to penetration than did similar material elsewhere observed.

Nothing in the alluvial layers beneath the surface clays was discovered (save in one or two instances) which would afford any decided resistance to erosion.

FOSSILS OF THE MARINE TERTIARY STRATA.

These fossils are very small, though belonging, oftentimes certainly, to species which obtain larger size in the adjoining beds in Mississippi.

As previously stated, it is believed that the dwarfing of size must be accounted for by the periodic destruction of marine life by the fresh waters of the north in this estuary of the "marine Tertiary" sea.

Every fossil well enough preserved, in whole or part, to indicate its species was carefully preserved and mounted upon card-board.

These specimens are now in the possession of Dr. Hambach, of Washington University, who has kindly consented to name them.

Whether a sufficient number of varieties are preserved to indicate with certainty the group of the marine Tertiary penetrated in the various borings is not certain.

Respectfully, your obedient servant,

E. H. WILSON.
First Lieut. SMITH S. LEACH,
Secretary Mississippi River Commission.

DETAILED REPORTS OF BORINGS.

VICINITY OF MEMPHIS, TENNESSEE.

BORING No. 1.

The party commenced this, their first boring, on December 29, under the Memphis bluffs, just below the site of old Fort Pickering, principally to determine the character of the Tertiary layers, so permitting comparison with the strata upon which the alluvion of the Mississippi rests, which it is hoped may be reached in the proposed borings in the river lowlands.

The ferruginous sandstone preventing the penetration of the bluff gravel (the name given to the quartenary deposit of gravel, vari-colored sands, and clays, resting upon the Lignitic Tertiary, by Safford, in his Tennessee report), a second attempt was made within a few feet of the first boring, in the hope that, on account of the usual want of continuity of the sandstone, we might be successful in avoiding the obstacle, but, the same result following, the immediate locality was abandoned. Though the principal object for which the boring was undertaken was thus defeated, the results are preserved, as affording an interesting section of the bluff gravel. The singularly varied appearance of this deposit is beautifully shown at points in the bluff as we approach Memphis from the location of the boring, where the undermining action of the prevailing high-water has uncovered fresh surfaces. The light shades of blue, lavender, green, pink, all shades of yellow, brown, snowy white, are mingled in the greatest confusion. The stratification is also very irregular. The sand-rock, which stopped the progress of the boring, it seems, is here of unusual extent, appearing above the water at low stages of the river, some distance from the bank, which, washing away the overlying material, has been unable to remove the rock. Major Benyaurd states that he has contemplated getting his supply of rock for sinking mats from this source. It seems possible that the submerged bar which extends from this point to the head of President Island may be an extension of this sandstone layer. The top of bluff, which is 69.3 feet above zero of boring proper, has been made the zero of the following tables.

No.	Notes and analysis.	Location of strata.		Diameter to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Surface soil, brown loam	0.0	28.4	1,000	500
	Grows slightly lighter in color and more clayey on descending.				
2	Light brown clay (loess) at 28.4 feet	28.4	25.9	1,200	300
	It is slightly porous; becomes more porous and gradually becomes lighter on descending.				
2 A	A sample from 50 feet.				
3	Sand	54.3	15.0	70	20
	The color is light yellow at 54.3 feet, but is variegated on descending, changing from light yellow to red. From 65.3 feet to 69.3 feet (69.3 feet = 0 of boring) streaks of gravel and a few clay nodules occur, and the sand is of a reddish yellow color. The sample is from 64 feet, where it is sand 25 per cent. and gravel 75 per cent. The sand of sample is similar, excepting color, to that above.	.....	.....	3	1¾″
4 {	Yellowish sand, 40 per cent	69.3	31.5	50	20
4 {	Gravel, 60 per cent	.....	.....	6	3¼″
	At 69.3 feet it is 70 per cent. yellow sand and 30 per cent. gravel. The color becomes slightly lighter on descending to 76.8 feet, thence to 95.3 feet the per cent. of gravel increases. At 85.1 feet it is 60 per cent. gravel; at 95 feet it is 90 per cent. gravel. From 85.1 feet to 95.3 feet the sand becomes reddish yellow. The sample is from 85.1 feet. Largest pebble 3¼ by 1¼ by 1 inch.				
4 A {	Light yellow sand, 40 per cent	95.3	5.5	30	20
4 A {	Gravel, 60 per cent	.....	.....	12	2½″
	No large gravel occurs from 95.3 feet to 95.4 feet. From 95.4 feet the gravel grows coarser and the sand becomes reddish yellow. Largest gravel 2½ by 2 by 1 inch. The sample is from 95.3 feet.				
4 B	Pebbles from No. 4.				
5	Light yellow clay	100.8	0.05	<3,000	50
	Contains reddish, sandy streaks.				
6	Light yellow sand	100.85	4.55	100	20
	At 100.85 feet, where sample is from, it is light yellow sand. From 102.8 feet to 105.4 feet it is reddish yellow sand.				
7	Light yellowish clay	105.4	0.025	<3,000	
	The sample contains sand adhering to clay.				
8	Yellow sand	105.425	1.975	100	50
	Changes to reddish yellow sand on descending.				
8 A	A sample from 106.8 feet	106.8	.....	90	30
	Contains particles of mica.				
8 B	Reddish brown sandstone from 106.3 feet.				
9	Fragments of ferruginous sandstone, which prevented further progress in this boring.	107.4			

Respectfully submitted.

E. H. WILSON,
Assistant, in charge.

First Lieut. SMITH S. LEACH,
Secretary Mississippi River Commission.

BORING No. 2.

Boring No. 2 was commenced on January 2, and completed on January 16, 1880. Heavy rains, during this time, caused the loss of twenty-two working-hours.

The principal cause of delay, however, was through the loss of a sand-pump, which became detached from the rods at a depth of 137.1 feet. All the devices that had in former experiences been successful now failed to rescue the pump.

The boring was continued to a depth of 168.2 feet with the 2-inch tools, through the lost 3-inch pump; not, however, without many interruptions by the shifting of position of the obstacle. At the depth last mentioned, further progress was barred, and we commenced pulling up the pipe, at the same time keeping the pump fastened to the rods with a barbed conical auger at the shoe of pipe as it was raised. On bringing the pump to the surface it was discovered that the end had been split and distorted so that it could not enter pipe. This had been caused, probably, by the unusual force exerted in sinking through the very hard clay, and is recorded as the first accident of the kind that the party has met with. The boring was now recommenced and speedily completed at the greatest depth yet attained—275.1 feet.

The 50-foot section of the bluff has been coupled to the boring proper, so that its notes read continuously from the top of the bluff as the zero.

Though no fossils were found, the traces of lignitized vegetable matter seen in the clay layer encountered at 139.3 feet make it probable that that point marks the division between the "bluff gravel" (Safford) or "orange sands" (Hilgard) and the Tertiary strata.

No *beds* of lignite were encountered, though lignite in place, as rootlets, probably, was found at several points, and traces throughout the remarkably deep clay bed.

The metallic nodules found imbedded in the stiff clay at 266 feet are a noteworthy feature of the boring. Several similar concretions were found between the depths of 250 feet and 260 feet; but as their location on top of pump made it probable that they were caught while drawing up the core, their accurate location could not be assigned. At 272.2 feet an obstacle was encountered that returned a metallic ring on striking with pump, evidently quite large, as it could not be broken and brought up in pump, and required vigorous work to drive it to one side.

Nothing similar to the calcareous concretions, about one-thirtieth of an inch in diameter, found at 204 feet, has been discovered in previous borings. An incomplete examination failed to identify them as organisms.

As but one located point could be discovered opposite, on President's Island, the location of the boring could not be secured by triangulation.

Points for other methods of location, vertically and horizontally, not being found, the boring was marked by an oak post, with its number, depth, and date of completion, and fixed in reference to a bench-mark.

Various facts are contained in the accompanying sketch which may assist in its subsequent identification and location.

No.	Notes and analysis.	Location of layers.		Diameter to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Surface soil, brown loam. The color becomes lighter with the descent.	0.0	1.0	1,500	500
2	Yellowish clay (loess). At 1 foot it is brownish; becomes lighter on descending to 46 feet; thence it is sandy and varied in color, being grayish and shades of yellow. From 40 feet gravel occurs, distributed without any apparent regularity. The per cent. is too small to estimate; average size ¾ inch. The sample is from 1.5 feet. A marked feature of this stratum is the traces of decayed vegetable matter, resembling rootlets, which are probably of recent growth. The silicious character of this loess deposit, very marked toward the bottom of stratum, is hardly noticeable toward the top.	1.0	46.2	1,500	600
2 A	A sample from 44 feet	.....	.....	2,000	500
3	Yellowish sand, 70 per cent	47.2	8.7	60	20
	Gravel, 30 per cent	.....	.....	4	5″
	From 47.2 feet to 49.3 feet the sand is reddish yellow, and the per cent. of gravel increases from 0 to 90 (average size, $\frac{1}{10}$ inch; grain, 1½ inches). At 49.1 feet there is a streak of fine gravel. Masses of bluish gray sand occur, differing from surrounding sand only in color (50 feet = 0 of boring). From 49.3 feet to 53.8 feet it is 85 per cent. sand, changing from light yellow to reddish yellow, and 15 per cent. gravel. The per cent. of gravel increases from 50 per cent. at 54 feet to 90 per cent. at 55.9 feet; but the coarseness decreases from 55 feet to 55.9 feet. Very coarse gravel (largest 5 inches) occurred from 54 feet to 55.5 feet. The sand of this stratum has a mucilaginous feel when moist. The sample (sand) is from 48 feet.				
3 A	Pebbles from 54 feet to 55.5 feet.				
4	Grayish clay. Contains some yellowish clay, blending into the gray clay. From 56.5 feet to 57 feet it is gray sandy clay, thence gray and yellowish clay.	55.9	4.9	3,000	100
5	Yellow sand. The color changes from light yellow at 60.8 feet to reddish yellow at 63 feet.	60.8	2.2	90	40
6	Grayish sand, 40 per cent	63.0	30.9	.....	.....
	Gravel, 60 per cent	.....	.....	.....	.....
	At 63 feet, 74.1 feet, and 92.6 feet the sand is yellowish gray. No abrupt change of color occurs. The per cent. and coarseness of the gravel varies. At 63 feet it is 5 per cent. gravel; at 66.4 feet 50 per cent. (largest 1½ by 1⅜ by ¾ inch); at 74.1 feet 30 per cent. (largest 1 inch); at 76.4 feet 60 per cent. (largest > 2¼ inches; at 88.4 feet, 60 per cent. (largest ⅞ inch); at 92.6 feet 50 per cent. (largest 1¼ inch). The sample is from 66.4 feet.				

No.	Notes and analysis.	Location of layers.		Diameter to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
6 A	A sample from 88.4 feet.				
6 B	Pebbles from No. 6; some of them contain fossils.				
7	Yellow sand, 95 per cent	93.9	5.9	60	20
7	Gravel, 5 per cent	.....	.....	12	$\frac{5}{8}$″
	The color changes to reddish yellow at 95 feet, thence grows slightly lighter with the descent.				
8	Light yellow sand, 50 per cent	99.8	17.7	70	20
8	Gravel, 50 per cent	.....	.....	8	$1\frac{7}{8}$″
	At 99.8 feet it is 10 per cent. gravel (largest 1 inch); at 102.8 feet 15 per cent. (average $\frac{1}{8}$ inch, largest $1\frac{7}{8}$ inch); at 118 feet 25 per cent. (largest 1 inch); at 117 feet 5 per cent. (average $\frac{1}{8}$ inch, largest $\frac{3}{4}$ inch). Sample is from 102.8 feet.				
8 A	A sample from 117 feet.				
9	Yellow sand, 70 per cent	117.5	14.7	80	20
9	Gravel, 30 per cent	.....	.....	12	1
	From 117.5 feet to 119.4 feet the color of the sand changes from brownish yellow to yellow, and the per cent. of gravel decreases from 40 per cent. to 5 per cent.; thence to 124.1 feet the color of the sand becomes brownish red; thence to 130.7 feet, yellow. At 124.1 feet it is 40 per cent. gravel (average $\frac{1}{16}$ inch), and contains fragments of conglomerate; thence to 130.7 feet it is 10 per cent. gravel. The sample is from 117.5 feet.				
9 A	Fragments of conglomerate from 124.1 feet.				
9 B	A sample from 130.7 feet.				
10	Gray and yellow clay	132.2	0.05	3,000	100
	The upper portion of this layer is of fine texture, but the rest of the layer is sandy clay.				
11	Yellow clay	132.25	1.15	125	60
12	Gray clay	133.4	0.7	2,000	100
	At 133.4 feet it is gray and yellow clay, but changes to gray clay on descending.				
13	Yellow sand	134.1	5.2	100	50
14	Clay	139.3	11.5	2,000	250
	At 139.3 feet it is yellow clayey sand, which grows finer and stiffer, becoming clay on descending. A sample from 140 feet shows the change from yellow to brown clay. At 146.3 feet the color changes from brown to bluish; at 147 feet, to brown again; at 148 feet, to blue; thence continues bluish clay. Brown streaks of decayed vegetation exist throughout this layer, but are more noticeable in the upper part of layer. Several specimens are preserved.				
15	Bluish sand	150.8	3.7	250	80
16	Blue clay	154.5	12.9	3,000	.....
	This clay is blue when fresh from the boring, but changes to light brown with greenish tinge on exposure. Contains traces of decayed vegetable matter. A sample from 155.5 feet contains a small ferruginous sand conglomerate that occurred there.				
17	Blue sand	167.4	1.1	150	40
18	Clay	168.5	106.6	.....	.....
	Color, shades of blue and brown. At 168.5 feet it is brownish blue; at 169.4 feet, bluish brown; at 170 feet the texture is coarser, but becomes finer on descending; at 172.3 feet it is drab colored; at 178.4 feet, brownish; at 180 feet, light blue; at 184.7 feet, blue, containing calcareous concretions. From 196 feet to 216 feet it grows lighter in color, and contains calcareous concretions at 204 feet, and yellow streaks from 203 feet to 205 feet; thence (from 216 feet) to end of boring it is various shades of brown, varying in texture, but in general it is coarser than upper part of strata. Traces of decayed vegetation exist throughout this stratum, but it occurred in more massive form at 261.3 feet. Metallic nodules (probably iron pyrites) occurred at 266 feet. The sample contains specimens showing all the changes of color and texture and traces of decayed vegetation. The color becomes lighter on drying, the light blue becoming almost white. Boring ended at 275.1 feet.				

Respectfully submitted.

E. H. WILSON,
Assistant, in charge.

First Lieut. SMITH S. LEACH,
Secretary Mississippi River Commission.

Boring No. 3.

The party reached Hampton Landing, Ark., from the mouth of Nonconnor Creek, on the 18th of January, 1880. Boring No. 3 was commenced on Monday the 19th, and completed at 3 p. m. on the 21st instant.

The forcible tendency of the sand between 110 and 146 feet to rise in the pipe is the only noteworthy mechanical feature of the boring.

Specimen No. 8 presents the first instance of the intimate mixture of sand, gravel and clay that the borings of the party in the Mississippi alluvium have disclosed, where the material was not clearly of "clay ball" origin. The lignitized vegetation and metallic concretions found in the clay layer in which the boring ended correspond to the similar features of the lower clay of Boring No. 2, which belongs, undoubtedly, to the Lignitic Tertiary period.

The location of the boring in reference to the triangulation system is shown in sketch on back of the accompanying report blank.

No.	Notes and analysis.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Surface soil, brown loam. Grows slightly coarser on descending. Contains rootlets and decayed vegetation.	0.0	12.5	800	200
2	Bluish brown, sandy clay	12.5	0.5	1,200	500
3	Brownish gray sand. Contains particles of lignite wash.	13.0	5.5	200	20
4	Brownish blue clay. The sand in sample is from adjacent layer.	18.5	0.1	2,500	1,000
5	Light brown sand, 70 per cent	18.6	30.4	100	20
	Gravel, 30 per cent. At 19.5 feet it is light brown sand, grows coarser to 20 feet, where there is a streak of gravel. From 20 to 33.5 feet it is 40 per cent. fine gravel. At 33.5 feet a few pebbles occur (largest 1½ inches), and the sand is slightly lighter in color; thence the texture is slightly finer. Contains lignite wash.	.....	.....	15	1¾″
5 A	Gravel from 20 feet	.....	.....	¾″	1¾″
5B	Light brown sand, 80 per cent	.....	.....	100	20
	Gravel, 20 per cent. A sample from 33.5 feet.	.....	.....	15	1½″
6	Brownish gray sand, 80 per cent	49.0	5.0	80	20
	Gravel, 20 per cent. The per cent. of gravel increases from 10 per cent. at 49 feet to 30 per cent at 54 feet. Contains lignite wash.	.....	.....	15	1½″
7	Dark sand, 60 per cent	54.0	55.1	80	20
	Gravel, 40 per cent. The sample is from 54 feet. A piece of wood and some pieces of lignite wash occurred at 61 feet. The per cent. of gravel increases to 69.7 feet.	.....	.....	15	1¼″
7A	Dark sand, 30 per cent	.....	.....	80	20
	Gravel, 70 per cent. A sample from 69.7 feet. Some lignite wash was found at 70.2 feet.	.....	.....	6	2⅝″
7 B	Dark sand. A sample from 75.2 feet. No gravel was found from 75.2 to 83.9 feet.	.....	.....	100	30
7 C	Clay nodules from 83.9 feet. From 83.9 to 109.1 feet it is 80 per cent. gravel and 20 per cent. sand, similar to 7 A. Largest pebble 2⅝ by 1½ by 1¼ inches.	.....	.....	.....	.....
7 D	Pebbles from No. 7.				
8	Dark blue clay. Contains sand and gravel distributed throughout..	109.1	0.3	1,000	>20
9	Dark sand, 30 per cent	109.4	32.5	80	20
	Gravel, 70 per cent. The sample is from 113.5 feet. The per cent. of gravel at 109.4 feet is small, but increases on descending. At 110.6 feet some lignite wash and pieces of wood occurred.	.....	.....	6	3″
9 A	Dark sand. A sample from 117.9 feet. No gravel was found from 117.9 to 121.9 feet; at 121.9 feet it is 50 per cent. gravel; from 126.4 feet the sand is slightly lighter in color, and the per cent. of gravel increases from 50 per cent. at 126.4 feet to 85 per cent. at 128.9 feet; thence no change. At 138 feet some lumps of lignite wash occurred.	.....	.....	80	20
9 B	Pebbles from No. 9; largest 3 by 1¾ by ⅝ inches.				
10	Brownish sandy clay	141.9	0.3	600	200

No.	Name and analysis.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
11	Gray sand	142.2	3.8	100	20
12	Bluish brown clay	146.0	29.5	3,000	500
	At 146 feet it is sandy clay, and contains traces of decayed vegetation; from 146 to 150 feet the texture becomes finer; from 150 to 157 feet it is of fine texture, and contains faint traces of decayed vegetation; from 157 to 170 feet the texture is coarsest (sandy), and traces of decayed vegetation are more apparent; thence to 175.5 feet (end of boring) the texture is slightly finer, and the traces of decayed vegetation are less apparent; at 158.9 feet several small ($\frac{1}{8}$ inch and less) metallic nodules, probably iron pyrites, occurred.	.....	.....	1,200	100

Respectfully submitted.

E. H. WILSON,
Assistant, in charge.

First Lieut. SMITH S. LEACH,
Secretary Mississippi River Commission.

BORING No. 3 A.

Boring No. 3 A was undertaken to investigate the character and depth of the heavy gravel deposit that is the marked feature of the Arkansas bank in the neighborhood of Reeves' Bunch, as diclosed by the river in its lowest stages.

A striking instance of the lack of continuity of the alluvial layers is here shown. Boring No. 3 was located 50 feet back of a point on the bank under which this gravel layer was said to be particularly noticeable, and missed it. This layer is represented in boring No. 3 A, by specimens Nos. 4 and 6. The occurrence of a small amount of clay, preserved as specimen No. 5, between gravel beds is singular. Nothing except its position would lead to the belief that it existed as a clay ball.

No.	Notes and analysis.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Surface soil, brown loam	0.0	9.2	2,500	1,500
	Contains rootlets.				
2	Brown clay	9.2	2.3	2,000	1,000
	Contains streaks of an iron-rust color.				
3	Bluish clay	11.5	11.2	2,500	1,000
4	Dark sand, 30 per cent	22.7	3.1	80	20
	Gravel, 70 per cent	.....	.....	12	$1\frac{1}{2}''$
5	Blue clay	25.8	0.2	2,500	1,500
6	Dark sand, 35 per cent	26.0	3.8	60	20
	Gravel, 65 per cent	.....	.....	10	2″
6 A	Pebbles from No. 6, largest 2 by $1\frac{1}{8}$ by $\frac{5}{8}$ inches.				
7	Brownish yellow sand, 80 per cent	29.8	9.9	50	20
	Gravel, 20 per cent	.....	.....	12	$1\frac{7}{8}''$
	Only a few pebbles exceeding $\frac{1}{4}$-inch diameter occurred.				
7 A	Pebbles from No. 7, largest $1\frac{7}{8}$ by $1\frac{1}{8}$ by $\frac{7}{8}$ inches.				
8	Dark sand, 80 per cent	39.7	21.3	80	20
	Gravel, 20 per cent	.....	.....	12	$1\frac{3}{4}''$
	Occasionally a pebble, whose greatest diameter is between $\frac{3}{4}$ and $1\frac{1}{2}$ inches, was found. Boring ended at 61 feet.				

Respectfully submitted.

E. H. WILSON,
Assistant, in charge.

First Lieut. SMITH S. LEACH,
Secretary Mississippi River Commission.

VICINITY OF HELENA, ARKANSAS.

BORING No. 1.

Moved from the Memphis Reach in the quarter-boat Arkansas, floating with the current.

The derrick was erected and the boring commenced on Saturday the 24th, and completed on Saturday the 31st of January, in the evening of which day we were prepared to leave for the next boring.

Mechanically, no features of unusual interest are to be recorded.

Specimen No. 6 is interesting as showing a deeply located bed of alluvial clay. The wood it contains is not lignitized.

Though the clay from 162.3 feet to the end of boring (206.4 feet) everywhere shows lignitized vegetable matter, which is suggestive of rootlets generally, specimen No. 13 is unquestionably from a layer of lignite.

No.	Notes and analysis.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Surface soil, light-brown sand	0.0	5.0	400	100
2	Bluish clay. At 5 feet it is sandy clay; becomes finer and stiffer on descending to 8 feet; thence no change. The sample is from 8 feet.	5.0	22.7	<3,000	.....
3	Light-brown sand. The sample is from 27.7 feet. Grows slightly coarser on descending.	27.7	17.3	200	80
3 A	A sample from 31 feet	.....	.....	125	50
4	Dark sand. The sample is from 45 feet. It is slightly coarser on descending.	45.0	42.4	110	60
4 A	A sample from 76 feet	.....	.....	90	30
5	Dark gray sand, 45 per cent	87.4	29.0	60	20
	Gravel, 55 per cent. The sample is from 87.4 feet, where it is 10 per cent. gravel. The per cent. of gravel increases from 10 per cent. at 87.4 feet to 25 per cent. at 97.4 feet, and to 70 per cent. at 104 feet.	.....	.....	10	$1\frac{1}{4}''$
5 A	Dark-gray sand, 30 per cent	.....	.....	50	20
	Gravel, 70 per cent. A sample from 104 feet. At 110 feet it is 90 per cent. gravel (average, $\frac{1}{10}$ inch; largest, $\frac{3}{8}$ inch). A few lumps of lignite wash occurred at 110 feet.	.....	.....	6	$1\frac{1}{2}''$
5 B	Dark-gray sand, 5 per cent	.....	.....	35	20
	Gravel, 95 per cent. A sample from 112 feet, where the gravel is coarser. From 112 to 116.4 feet, no change.	.....	.....	4	$2\frac{3}{8}''$
5 C	Pebbles from No. 5; largest, $2\frac{3}{8}$ by 2 by $1\frac{1}{2}$ inches. Most of these occurred from 104 to 116.4 feet.				
6	Blue clay. Contains sandy clay and pieces of partly decayed wood.	116.4	2.4	<3,000	100
7	Dark sand, 25 per cent	118.8	23.9	50	20
	Gravel, 75 per cent. The sample is from 128 feet. The per cent. of gravel increases from 60 per cent. at 119 feet to 80 per cent. at 128 feet; thence the gravel is finer, and forms about 75 per cent. Several limestone pebbles were found. At 128 and 135 feet fragments of conglomerate were found, the cementing material being calcareous.	.....	.....	5	$3\frac{1}{2}''$
7 A	Dark sand, 25 per cent	.....	.....	60	20
	Gravel, 75 per cent. A sample from 133.5 feet.	.....	.....	7	.....
7 B	Pebbles from No. 7. Some of them contain fossils.				
8	Dark sand	142.7	8.6	65	20
9	Dark sand, 45 per cent	151.3	5.5	70	20
	Gravel, 55 per cent. The sample is from 151.3 feet. At 152 feet the sand is light brown, but soon changes on descending to dark sand like sample.	.....	.....	8	$2\frac{1}{4}''$
9 A	Pebbles from No. 9; largest $2\frac{1}{4}$ by $1\frac{1}{2}$ by $1\frac{1}{2}$ inches. Some of them contain fossils.				
10	Dark sand. A few pebbles occurred at 160 feet; largest, $2\frac{1}{8}$ by $1\frac{3}{8}$ by $\frac{3}{4}$ inches.	156.8	4.7	100	>20
11	Dark sand, 35 per cent	161.5	0.8	60	20
	Gravel, 65 per cent	.....	.....	8	$\frac{7}{8}''$

No.	Notes and anaylsis.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
12	Clay. The color is bluish green to 182 feet; thence it is different shades of brown, which color is probably due to the more general distribution of vegetable matter. Traces of lignitized vegetation, and occasionally whitish calcareous material, occur from 162.3 to 182 feet.	162.3	27.3	<3,000	2,000
13	Brown lignite	189.6	0.1	.....	.....
14	Clay. The color is light brown to 201 feet; thence bluish. From 189.7 to 193.6 feet it becomes softer; thence, to 200 feet, stiffer and finer in texture. The traces of lignitized vegetation diminished from 201 to 206.4 feet, end of boring.	189.7	16.7	<3,000	2,000

Respectfully submitted.

E. H. WILSON,
Assistant, in charge.

First Lieut. SMITH S. LEACH,
Secretary Mississippi River Commission.

BORING NO. 2.

The boring is situated on a bench which seems almost to indicate a slide in the bluffs when Crowley's Ridge was washed by the river.

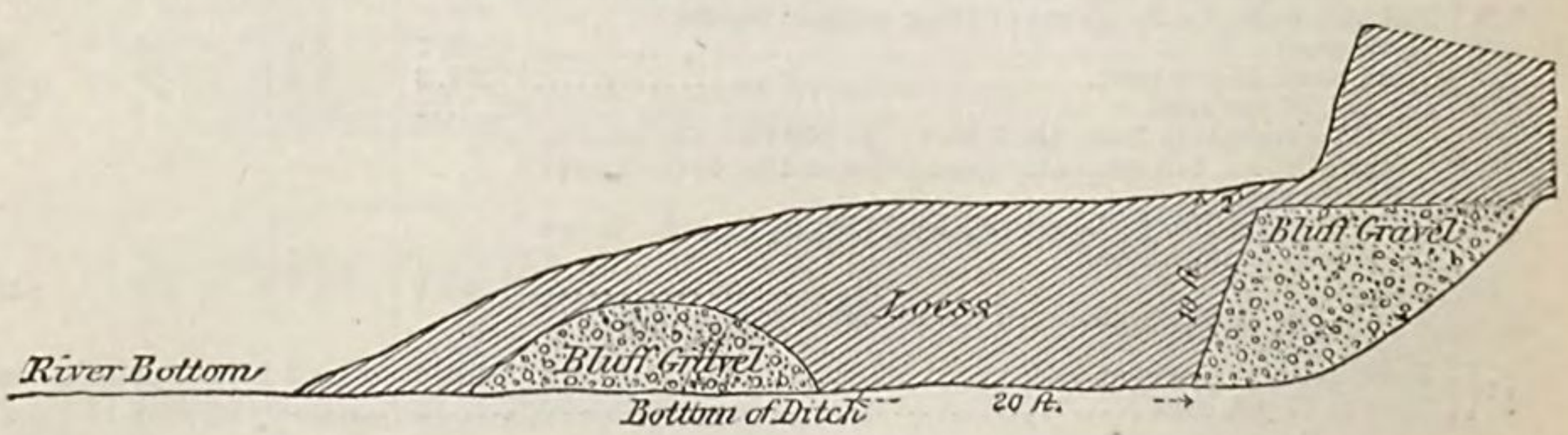
This appearance is given further color to by the small amount of the bluff gravel in the boring (Sample No. 5), the loess resting immediately upon the bluish clays, as shown in the boring.

Observation at various other points, however, indicates that the same general results would be obtained where there is not the slightest trace of disturbance, and that the results of the boring may be considered a trustworthy, though somewhat unusual, display of the ever-varying deposit of the region.

As we proceed southward from the boring, the highlands, nowhere very abrupt in their ascent from the alluvial plains, present a noticeably less bluff-like appearance. Occasionally traces of gravel are to be seen, which indicate a general elevation of the top of the layer of about 15 feet above the bottom land, but, generally, in this direction the gravel is concealed in the long grassy slope.

The loess here has the same characteristic that marks it wherever observed—of standing for long periods in vertical walls. The triangulation station, which marks the zero of the section, is situated within the fortifications on top of the bluff, whose trenches still present vertical faces as perfect as when cut fifteen or twenty years ago. The excavations in the bottom of the layer, by the town people, for street-filling and brick-making material, show the same tendency to preserve vertical faces. This characteristic holding good here as elsewhere, the comparatively long slopes that mark the rise from the bottom of Crowley's Ridge must bear witness to the very great period of time that has elapsed since the river has washed its base and given the ridge bluff banks.

Excavations one-half mile north of the boring, on a street extension through a long ridge that runs north and south through the west part of town, show the loess, particularly rich in shells, resting immediately upon a bed of bluish clay, in which no fossils were observed. A short distance farther north the gravel is seen in abundance immediately beneath the loess. An example of the extreme irregularity of the surface dividing the loess and gravel is disclosed by a deep narrow ditch running east and west at the north end of the town.



Three hundred feet south of the boring, in a ravine, a section of a narrow ridge of gravel, running, apparently, north and south, shows a maximum thickness of about 20 feet from elevation of the bottom upward. In the boring this bed is missed entirely or represented by the layer but 3½ feet thick, about 25 feet lower. Going northward, the top of the sand and gravel layer is rarely seen more than 20 feet, and generally about 10 feet, above the bottom land, until at a point 3 miles north of the boring it rises very abruptly. A section at this distance, at the Big Spring, will be approximately as follows: From the Big Spring, 4 or 5 feet above the bottom-land—

25 feet sand and coarse gravel.
2 feet potter's clay (local).
43 feet sand and finer gravel.
90 feet loess.

Two hundred feet south of the Big Spring an exposure of a very unusual nature is shown in a deep ravine about 25 feet above the bottom. It consists of ten or twelve horizontal layers, about 1 foot thick, of sand and blnish clay alternating. The clay is somewhat shaly, and the orange sand is in thin laminæ.

As regards the color of the bluff gravel deposit, everywhere in the vicinity of Helena an absence of bright tints is noticeable; the prevailing color is a dirty yellowish-white, with an occasional deep, dull reddish tinge; bright, variegated, and orange tints are rare.

Some very large stones have been observed among the gravel, here, as everywhere in the deposit, derived principally from the carboniferous chert.

Several stones found in the vicinity of the Big Spring weigh between 10 and 20 pounds.

This boring is the first in which lignite has not been found. The age of the clays can be determined, however, from the fossils found between 196 feet and 203.8 feet. The largest fossil is not perfect, but resembles a tertiary gasteropod, pictured by Owen, in his Arkansas Geological Report, and named "Monocero vetustus." An inspection of the several other specimens from this layer—preserved in a fair condition—will enable a specialist to fix the age of the deposit beyond question.

Our past experience in boring in supposably the same formation did not prepare us for the heavy work incurred in sinking into the limestone layers. It is to be regretted that they were not examined further, even were it not possible to pierce them. With construction of heavy drills and drill-rods, this could be done at some future time.

In sinking three bored wells into this bluff deposit half a mile north of the boring, obstacles were encountered at depths of between 50 and 75 feet which broke the augers and successfully resisted all efforts with rude appliances to sink through them. It does not appear what the nature of the obstacles was, but they may fairly be supposed to be of the same character as that which stopped our boring.

To sum up, the difference between the exposed layers here and at all points observed elsewhere shows:

1. Greater thickness of loess, and, consequently,
2. Less thickness of bluff gravel.
3. Extensive layers of clay, in place of the gravel, supporting the loess.
4. A much more general distribution of fossils in the loess beds.
5. Absence of bright and variegated tints in the bluff gravel deposit.

Differences in the boring from any made heretofore are:

1. Absence of lignite.
2. Existence of fossils.
3. Existence of hard rock; the only example thereof in previous borings being a thin layer of clay shale at the boring under Fort Pillow.

No.	Notes and analysis.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Surface-soil, light-brown loam. Grows lighter on descending, and changes to No. 2.	0. 0	0. 5	1, 000	500
2	Yellowish loam (loess) ..... Fresh-water gasteropods of one type, though of sizes varying from one-tenth to one and one-quarter inches, abound in the upper part of the stratum, and irregular-shaped calcareous concretions in the lower part. The sample is from 12 feet, and contains fossils.	0. 5	139. 2	1, 200	500
2A.	A sample from 109 feet ..... The lower part of this stratum is more siliceous than the upper part.	.....	.....	1, 500	00

No.	Notes and analysis.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
3	Brownish-blue sandy clay	139.7	19.1	2,000	800
	Becomes stiffer at 156.3 feet; thence no change. The sample is from 147.5 feet.				
3 A.	A sample from 156.3 feet	.....	.....	2,500	1,000
4	Yellowish, sandy clay	158.8	9.0	2,000	800
	Resembles loess. No shell remains found.				
5	Yellow, clayey sand, 10 per cent	167.8	3.5	1,000	20
	Gravel, 90 per cent	.....	.....	1	0
6	Brownish clay	171.3	39.9	<3,000	520
	Contains sandy clay to 188 feet. At 181.3 feet it becomes stiffer; thence it is very stiff, but not very tenacious; that is, it is hard, but breaks easily. From 196 feet fossils and greenish, sandy material, in pockets, occurred. A great many fossils occurred at 203.8 feet.				
7	Hard limestone	211.2	0.2	.....	.....
8	Brownish clay	211.4	19.9	3,000	200
	Contains green sandy and calcareous material.				
9	Hard limestone	231.3	2.7	.....	.....
	Only a few small fragments of this limestone could be obtained, it having been reduced to minute particles by the drill. This consisted, apparently, of several layers; each layer seemed hardest at the top.				
10	Brownish clay	234.0	2.8	2,500	80
	Contains some greenish, sandy material. Two fragments of limestone occurred at 235.9 feet.				
11	Limestone	236.8	0.3	.....	.....
	The sample consists of clay and minute fragments of limestone. The clay was probably scraped from the layers above by the action of the tools.				

Respectfully submitted.

E. H. WILSON,
Assistant, in charge.

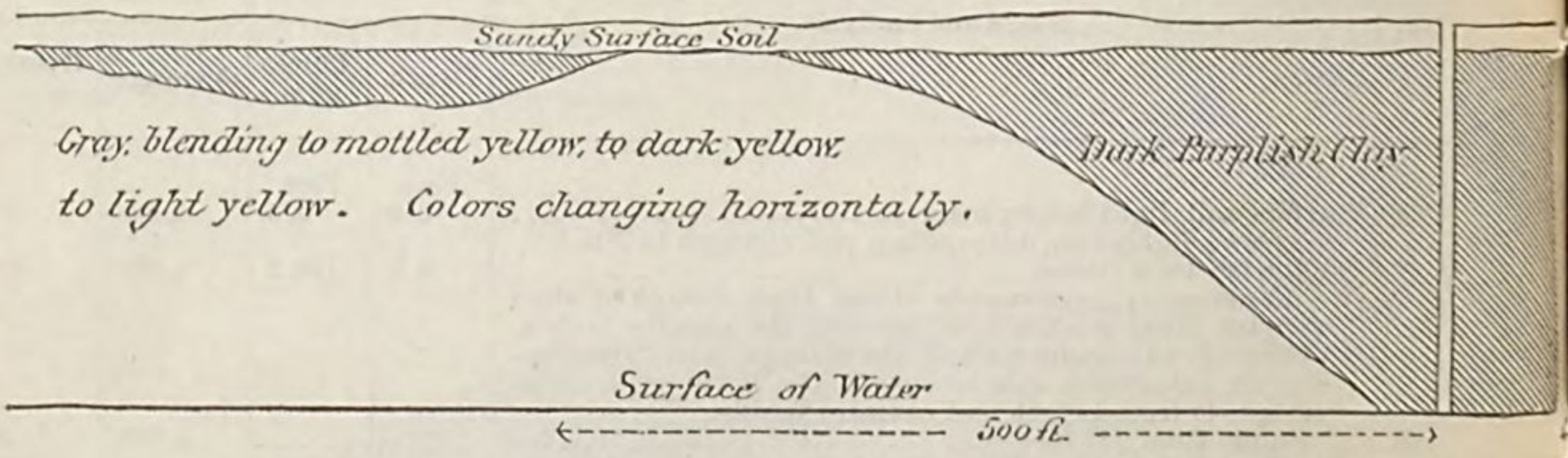
First Lieut. SMITH S. LEACH,
Secretary Mississippi River Commission.

VICINITY OF CHOCTAW BAR.

BORING No. 1.

The party reached the location of this boring, from Helena, Ark., on the evening of February 15, and commenced work on the boring on the morning of the 16th. On the 20th the pipe was pulled up, and at 3.40 p. m. the boat turned into the current for Eutaw, Miss.

Quite a different result as to the order and thickness of the different-colored clays of specimen No. 2 would be obtained by a slight change in the location of the boring, as is shown by the sketch below:


Sandy Surface Soil
Gray, blending to mottled yellow, to dark yellow to light yellow. Colors changing horizontally.
Dark Purplish Clay
Surface of Water
500 ft.

This yellowish "clay" resembles loess of the bluff formation in its porosity, texture, and tendency to preserve vertical faces, and differs therefrom in its mottled colors and certain tinges of red or pink, and, of course, in its position above the alluvial sand.

The limestone found at various points in the lower clays must be detached fragments or concretions, and not layers, judging from the manner in which they yielded to the drill.

Hilgard mentions the calcareous glauconitic sand (green sand), which was found throughout the lower clays, as characteristic of the Tertiary deposit of Mississippi.

Attention is called to the resemblance of several of the fossils found in this boring to those (figured on Plate III, opposite page 890, of the Report of the Chief of Engineers for 1878–'79, from fossils) found in the clays of the Lake Borgne borings.

No.	Notes and analysis.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Surface soil, light-brown sand ..... Contains rootlets.	0.0	2.4	500	150
2	Clay ..... The color is purplish; contains whitish calcareous streaks to 7 feet; thence to 10 feet it is bluish-gray and iron-rust colored, being mottled; thence to 15 feet it is grayish and yellowish and softer; thence to 26.2 feet it gradually becomes blue, but contains some of an iron-rust color; thence it is sandy, bluish clay, the coarseness increasing with the descent. This clay is much stiffer than most of the alluvial clays found heretofore.	2.4	24.1	<3,000	
3	Light-brown sand ..... The sample is from 27 feet; it becomes slightly coarser with the descent; a few rounded limestone pebbles occurred between 40 and 42.2 feet.	26.5	25.8	250	50
3 A	Limestone pebbles from between 40 feet and 42.2 feet.				
4	Light-brown sand, 75 per cent.....	52.3	43.1	80	20
	Gravel 25 per cent.....	.....	.....	4	2¾″
	This layer is a continuation of No. 3; it is about 5 per cent. gravel at 52.3 feet, where the sample was taken. The per cent. of gravel increases to 60 per cent. at 58.4 feet, thence it decreases, being 35 per cent. at 65 feet, at 25 per cent. 77 feet, and 5 per cent. at 89.7 feet. Most of the coarse gravel occurred between 54 feet and 65 feet, though a few large pebbles (one being limestone) occurred in the bottom of the layer. Some blue clay, equal in quantity to a layer 0.2 foot thick, occurred at 65.1 feet. No change was apparent in either color or texture of the sand and gravel above and below this clay.	.....	.....	<3,000	
4 A	Blue clay from 65.1 feet	.....	.....	<3,000	
4 B	A sample from 77 feet	.....	.....	60	20
4 C	Pepples from No. 4	.....	.....	.....	>4″
5	Blue clay..... From 95.4 feet to 95.7 feet the clay is brownish and contains sand and gravel; thence it is of fine texture. A calcareous pebble (in sample) occurred at 97 feet.	95.4	2.0	<3,000	
6	Dark sand 40 per cent	97.4	1.9	40	20
	Gravel 60 per cent.....	.....	.....	2	>4″
	Several large pebbles (>3″) occurred, one being granite. At 99.1 feet a hard limestone pebble (1½″ thick) occurred. It was broken by pump.				
6 A.	Pebbles and fragments of pebbles from No. 6.				
7	Clay..... Bluish brown (brown when dry) to 168 feet; thence bluish and not as stiff as above. Fossils occur below 105 feet throughout the stratum, to 175.3 feet (end of boring); but the clay is particularly rich in fossils from 112 feet to 124 feet, and at 166 feet. Greenish sandy material occurs to 166 feet, but below this it is not apparent. From 135 feet to 152 feet the clay contains brownish-gray sandy material. Limestone occurred at 150.4 feet and 169 feet.	99.3	>4.9	<3,000	

Respectfully submitted.

E. H. WILSON,
Assistant, in charge.

First Lieut. SMITH S. LEACH,
Secretary Mississippi River Commission.

BORING No. 2.

The party moved from Welborne Landing, Ark., on the 20th of February, and commenced this boring on the following morning.

In several of the preceding borings the work was delayed or stopped by meeting limestone obstacles in the clay, which were generally so large as to require breaking to bring up in the pumps; and, in consequence, their character could not be judged of. In this boring several of these obstacles (the same at least in composition and appearance as far as could be determined) were small enough to be brought to the surface uninjured, when their nodular or concretionary structure was disclosed.

At 185.1 feet a very hard substance was encountered that could not be made to yield with our appliances.

Though the drills penetrated into it one-tenth of a foot, no satisfactory sample could be obtained.

The specimen consists of probably a small part of the powdered substance mixed with the clay wash from above. It is probable that this obstacle was a large limestone concretion.

Possibly the hard deposit partially penetrated in the boring on Crowley's Ridge, (Helena, boring No. 2), in the same geological formation, may have been a collection of these concretions, though to all appearances it was composed of limestone layers.

The number and variety of the fossils found in the lower clay bed render the boring a very interesting one. All the fossils found are preserved in the samples of the boring, but it is feared that a great many of the more fragile specimens will be unrecognizable.

J. E. Cusky dropped a well-point and 1½-inch gas-pipe into our 3-inch tube to the gravel layer resting upon the clay bed at 121.3 feet. The flow of water was very strong here, welling up in our pipe to within a few feet of the surface. This is mentioned as showing the great value that our apparatus possesses in solving the important question of obtaining good water in the Mississippi River lowlands. The driven wells can rarely be sunk more than 40 feet, and the water found is generally very impure.

No.	Notes and analysis.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Surface soil, light-brown clay; contains rootlets	0.0	1.2	3,000	
2	Light-brown clayey sand; grows slightly coarser on descending. The sample is from 1.5 feet.	1.2	22.4	1,200	250
3	Bluish sandy clay; becomes stiffer on descending, but is nowhere very stiff. The sample is from 23.7 feet.	23.6	26.9	1,000	<100
3 A	A sample from 41 feet	.....	.....	2,000	500
4	Bluish quicksand. The sample is from 50.5 feet.	50.5	36.9	250	70
4 A	A sample from 75 feet	.....	.....	150	60
5	Blue clay; contains traces of decayed vegetation	87.4	1.0	3,000	
6	Bluish quicksand	88.4	1.1	200	50
7	Dark sand, 35 per cent	89.5	15.2	70	20
	Gravel, 65 per cent	.....	.....	10	>⅜″
	The sample is from 90 feet. From 103 to 104.7 feet the sand is light brown and the per cent. of gravel decreases.				
7 A	Pebbles from No. 7, largest >⅜ by 2¾ by 1¼ inches.				
8	Light-brown sand	104.7	13.4	60	30
9	Dark sand, 40 per cent	118.1	3.2	80	20
	Gravel, 60 per cent	.....	.....	10	2½″
	The sample is from 120 feet. At 118.1 feet it is light-brown sand 70 per cent. and gravel 30 per cent. The per cent, of gravel increases to 70 per cent. at 120 feet; thence, no change.				
9 A	Pebbles from No. 9, largest 2½ by 2½ by 1½ inches, is limestone.				
10	Brownish clay	121.3	55.2	<3,000	
	It is bluish brown at 121.3 feet; becomes brownish on descending. From 166 feet it has a slight bluish tinge. It is all brown, or dark brown, when dry. Green sand occurs throughout the stratum, but is more abundant from 124 to 125 feet; from 129 to 130 feet; at 135, 137.7 feet; from 144 to 146.5 feet; at 166 and 169 feet. Grayish-brown sandy material occurs from 139 to 162 feet. Limestone concretions occur at 125 feet and from 129 to 130 feet. At 171.7 feet some soapstone (preserved in sample) occurred. The stratum is rich in fossils; most of them are gasteropods, but branchiopods and lamellibranchs occur also.				

No.	Notes and analysis.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
11	Light-green clay ..... Contains fossils. This clay is not as tenacious as No. 10.	176.5	8.6	<3,000	
12	Rock ..... No sample of this rock could be obtained, but a sample of pasty material containing particles of rock was preserved. Drilled to 185.2 feet.	185.1	0.1		

Respectfully submitted.

E. H. WILSON,
Assistant, in charge.

First Lieut. SMITH S. LEACH,
Secretary Mississippi River Commission.

BORING NO. 3.

Left Eutaw Landing at 4 p. m., February 27, 1880, for Mound Place, Miss. A violent wind arose when opposite our destination, which prevented our landing, and drove us to the bank at Arkansas City. A tug towed the quarter-boat to Cook's Point, Ark., on the 28th, where, on the highest spot of land in the vicinity, boring No. 3 was located.

Work on the boring was commenced on March 1, and completed at 1 p. m. of the 3d, when the boat was turned into the current for Chicot City, Ark.

The lower clays are the same in all their characteristics as those found in the preceding borings on this reach. The boring was not sunk deeper than was necessary to determine this identity.

No.	Notes and analysis.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Surface soil, light-brown sand	0.0	2.7	350	80
2	Soft, yellowish-brown, sandy clay ..... The sample is from 2.7 feet; grows coarser, becoming quicksand at 27 feet.	2.7	24.3	1,200	350
2 A	A sample from 10 feet	.....	.....	900	100
3	Brownish-yellow quicksand ..... Becomes slightly coarser with the descent.	27.0	7.5	200	40
4	Blue clay	34.5	1.9	<3,000	
5	Light-brown sand	36.4	6.0	110	40
6	Dark sand	42.4	2.4	125	40
7	Dark-gray sand, 60 per cent	44.8.	79.8	80	20
	Gravel, 40 per cent ..... The sample is from 44.8 feet. At 44.8 feet it is 10 per cent. gravel; at 50.4 feet, 50 per cent.; at 56.1 feet, 30 per cent.; continues to be 30 per cent. to 86 feet; at 94 feet, 40 cent.; at 110 feet, 75 per cent.; at 120 feet, 35 per cent. The color, dark gray, remains the same throughout the layer. Most of the large pebbles occurred between 75 and 120 feet.	.....	.....	15	1¼″
7 A	Sand, 70 per cent	.....	.....	70	20
	Gravel, 30 per cent ..... A sample from 56.1 feet.	.....	.....	7	2¼′
7 B	Blue and brown clay from 63.4 feet, equal in quantity to a layer 0.2 foot thick. The color and texture of the sand and gravel above and below this clay were the same.				
7 C	Sand, 60 per cent	.....	.....	60	20
	Gravel, 40 per cent ..... A sample from 94 feet.	.....	.....	8	>3″
7 D	Sand, 25 per cent	.....	.....	50	20
	Gravel, 75 per cent ..... A sample from 110 feet.	.....	.....	6	3½″

No.	Notes and analysis.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
7 E	Pebbles from between 44.8 and 100 feet	.....	.....	.....	>3″
7 F	Pebbles from between 100 and 124.6 feet	.....	.....	.....	3½″
8	Light-brown sand. This sand had a purplish tinge when brought up; contains a few small pebbles.	124.6	5.0	150	>20
9	Dark-gray sand, 30 per cent	129.6	11.9	40	20
9	Gravel, 70 per cent. The sample is from 131.8 feet. The per cent. of gravel increases from 30 per cent. at 130 feet to 75 per cent. at 131.8 feet; thence decreases to 50 per cent. at 140 feet; thence it is 90 per cent. coarse gravel, most of the large pebbles being limestone.	.....	.....	12	>3¾″
9 A	Pebbles from between 129.6 and 140 feet.				
9 B	Pebbles from between 140 and 141.5 feet	.....	.....	.....	3¼″
10	Brownish clay. This color is assumed on exposure. When brought to the surface it has a dark-green tinge. This clay has a slight bluish tinge on descending. Some talc occurs at 145 feet. Fossils occur throughout the layer.	141.5	6.5	<3,000	
11	Greenish-gray clay. Contains fossils and green sandy material. The boring ended at 154.6 feet.	148.0	.....	<3,000	

Respectfully submitted.

E. H. WILSON,
Assistant, in charge.

First Lieut. SMITH S. LEACH,
Secretary Mississippi River Commission.

BORING No. 4.

The party reached the location of boring No. 4 from Cook's Point, Ark., on the morning of March 4, and completed the work at 3 p. m. of the 6th, when the boat was turned into the current for Mound Place, Miss.

The lower clay was penetrated only far enough to identify its geological character with certainty. A number of very perfect fossils are preserved in specimen No. 9 A.

No.	Notes and analysis.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Surface soil, light-brown sand	0.0	2.0	1,200	250
2	Light-brown sandy clay	2.0	1.8	700	300
3	Brown clay. The color is purplish when clay is brought to the surface.	3.8	2.2	2,500	200
4	Light-brown sandy clay	6.0	6.6	1,000	100
5	Light-brown sand. It is quicksand to 18 feet; grows coarser on descending; at 34 feet two pebbles (largest 2 inches) occurred, and at 37 feet some decayed woody material was found. The sand becomes slightly finer from 34 feet to 40 feet; thence it becomes coarser, and is 10 per cent. gravel at 43.2 feet. The sample is from 12.6 feet.	12.6	34.4	125	30
5 A	A sample from 18 feet	.....	.....	100	25
5 B	A sample from 34 feet	.....	.....	80	>20
5 C	A sample from 43.2 feet	.....	.....	50	>20
6	Yellow sand, 40 per cent	47.0	7.0	50	20
6	Gravel, 60 per cent	.....	.....	6	1½
7	Dark-gray sand, 88 per cent	54.0	46.7	60	20
7	Gravel, 12 per cent. The sample is from 54.6 feet. It is 5 per cent. gravel at 54 feet; thence to 63.1 feet the gravel disappears and the sand becomes some finer to 71 feet; from 63.1 feet the gravel appears and forms 10 per cent. at 71 feet, and increases to 25 per cent. at 94.6 feet.	.....	.....	15	2

No.	Notes and analysis.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
7 A	A sample from 63.1 feet	.....	.....	80	20
7 B	Sand, 90 per cent	.....	.....	100	20
	Gravel, 10 per cent	.....	.....	15	1⅜″
	A sample from 71 feet.				
7 C	Sand, 75 per cent	.....	.....	60	20
	Gravel, 25 per cent	.....	.....	15	1
	A sample from 94.6 feet.				
7 D	Pebbles from No. 7 (sample contains all that occurred).				
8	Dark-gray sand, 25 per cent	100.7	5.0	50	20
	Gravel, 75 per cent	.....	.....	8	.....
	The sample is from 100.7 feet. The percentage of gravel remains about the same, while the coarseness increases on descending. Very few large pebbles occurred from 100.7 feet to 104.4 feet, but from 104.4 feet to 105.7 feet the pebbles were large—limestone.				
8 A	A sample from 104.4 feet	.....	.....	.....	2⅝″
8 B	Pebbles from No. 8	.....	.....	.....	2⅝″
9	Brown clay	105.7	29.5	>3,000	.....
	From 110 feet to 122 feet this clay has a slight greenish tinge. It is rich in fossils and contains green sand, which is most abundant at 113 feet, 126 feet, and from 130 feet to 133 feet. Limestone concretions occurred frequently. The boring ended at 135.2 feet.				
9 A	Fossils preserved from No. 9.				

Respectfully submitted.

E. H. WILSON,
Assistant, in charge.

First Lieut. SMITH S. LEACH,
Secretary Mississippi River Commission.

BORING NO. 5.

Left Chicot City, Ark., at 3 p. m. of the 6th of March for Mound Place, Miss., where the quarter-boat was landed against the levee.

The boring is chiefly remarkable for its very deep bed of alluvial clay, from the surface to 68.2 feet. The surface of the ground in the vicinity shows no old river lines. No fossils were observed in this clay.

At 146.2 feet the pumps encountered an obstacle that offered great resistance to breaking or pushing aside. The pumps reached a depth of 146.2 feet by driving the large limestone concretion (supposably) into the clay, and as fossils already gotten as specimens had proved the similarity of the lower clay to that found in the previous borings on the Choctaw Bar Reach, a greater depth was not thought important enough to warrant a further expenditure of time.

W. E. Ringo availed himself of the opportunity afforded to drop a well point in the gravel layer to 109 feet, which promises an abundant supply of good water.

The quarter-boat was pulled into the current for the Lake Providence Reach at 3 p. m. of March 11, 1880.

No.	Notes and analysis.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Surface soil, light-brown loam	0.0	1.0	800	400
2	Brownish, sandy clay	1.0	4.3	1,000	300
3	Soft, light-brown clay	5.3	8.4	600	350
	It is stiffer from 8 feet to 13.7 feet.				
3 A	A sample from 8 feet.				
4	Blue clay	13.7	54.5		
	The sample is from 13.7 feet. It is soft, sandy clay to 15 feet; thence it is stiff clay, being stiffest from 23.6 feet to 26.6 feet and at 56.4 feet, and softest at 29.3 feet. At				

No.	Notes and analysis.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
	44.7 feet the clay is sandy. From 23.6 feet to 26.6 feet the clay contains streaks of an iron-rust color, and from 32.1 feet to 62 feet most of the clay has a purplish tinge; but in some places this purplish color is faint. At 49 feet some grayish clay occurred. From 17.3 feet to 18.3 feet is wood, sound, resting at an angle of 45 degrees, making log about 0.7 foot thick. About 0.2 foot of wood was found at 21.6 feet, and a root 1 inch in diameter at 23.6 feet. Possibly this cottonwood marks a wrack-heap.				
4 A	Clay from between 15 feet and 68.2 feet	.....	.....	<3,000	
4 B	Wood from 18.3 feet. Cottonwood.				
5	Dark, dirty-gray quicksand	68.2	7.8	125	40
6	Dark-gray sand	76.0	13.1	80	20
7	Dark-gray sand, 50 per cent	89.1	4.9	60	20
7	Gravel, 50 per cent	.....	.....	8	1½″
7 A	Pebbles from No. 7. (No duplicate.)				
8	Dark-gray sand	94.0	4.4	90	>20
9	Dark-gray sand, 60 per cent	98.4	8.6	80	20
9	Gravel, 40 per cent	.....	.....	8	2¼″
	Clay balls occurred in this layer.				
9 A	Pebbles from No. 9. (No duplicate.)				
9 B	Clay balls from No. 9.				
10	Yellowish-gray sand	107.0	1.3	70	20
11	Dark-gray sand, 40 per cent	108.3	0.7	60	20
11	Gravel, 60 per cent	.....	.....	6	>2½″
	Largest pebble, >2½ by 2¼ by 1 inch.				
11 A	Pebbles from No. 11.				
12	Dark, lead-colored clay	109.0	.....	<3,000	
	The texture and color changes but slightly. From 130 feet to 133 feet the clay is sandy. Green sand occurs more sparingly than in previous borings. Several limestone concretions were found. Most of the fossils occurred between 109 feet and 120 feet. From 145 feet the clay grows gradually (though slightly) lighter in color. The boring ended at 146.4 feet.				
12 A	Fossils preserved from No. 12.				

Respectfully submitted.

E. H. WILSON,
Assistant, in charge.

First Lieut. SMITH S. LEACH,
Secretary Mississippi River Commission.

VICINITY OF GREENVILLE, MISSISSIPPI.

BORING No. 1.

Reached this point on the evening of March 13, in passage between Choctaw Bar and Lake Providence Reaches. As wind and rain storms prevented floating, a boring was undertaken Tuesday morning and completed at noon of Wednesday, when the voyage to Meyersville was resumed.

The land in which the boring is located is very high in reference to the high-water mark, as is shown by the fact that it is 2 feet or more above the present surface of water, which has spread over nearly all the lands unprotected by levees between Memphis and Vicksburg.

The boring is chiefly remarkable as showing the least depth of the old formation beneath the surface so far observed. This formation at this point differs only from that found in the Choctaw Bar borings in showing much richer marls, in which the identity of the shell remains are quite or altogether destroyed by decay.

No.	Notes and analysis.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Surface soil, light-brown loam. Contains rootlets; becomes sandy, and changes to quicksand on descending.	0.0	2.4	1,200	400
2	Light brownish-yellow quicksand. The sample is from 2.4 feet. It becomes coarser on descending.	2.4	18.9	600	300
2 A	A sample from 10 feet	.....	.....	80	>20
3	Blue clay; contains sandy streaks	21.3	1.5	3,000	800
4	Yellowish-gray sand	22.8	4.1	70	20
5	Bluish-brown clay. Contains some sandy clay. Part of this clay had a purplish tinge.	26.9	1.1	3,000	.....
6	Yellowish gray sand, 70 per cent	28.0	22.2	60	20
	Gravel, 30 per cent	.....	.....	12	2
	The sample is from 28 feet. At 40 feet the color of sand is dark-gray, but it changes to yellowish-gray at 46 feet. The per cent. of gravel varies; at 28 feet it is 5 per cent.; at 35 feet, 15 per cent.; at 37 feet, 20 per cent.; at 40 feet, 60 per cent., and at 46 feet, 35 per cent. The coarseness of the gravel increases to 40 feet; thence it decreases. Particles and a few lumps of lignite wash occurred at 36.8 feet. Only a few pebbles exceeding 1 inch in diameter were found.				
6 A	A sample from 35 feet; gravel	.....	.....	12	2
6 B	A sample from 40 feet; gravel	.....	.....	10	1¾″
6 C	A sample from 46 feet; gravel	.....	.....	10	2
7	Dark-blue clay; contains sandy streaks	50.2	3.3	3,000	.....
8	Dark-gray sand, 65 per cent	53.5	10.5	50	20
	Gravel, 35 per cent	.....	.....	5	¾″
	The sample is from 54 feet; at 53.5 feet it is fine dark-gray sand; at 54 feet it is 40 per cent. gravel, and at 60 feet it is 30 per cent. gravel, but coarser than at 54 feet.				
8 A	A sample from 60 feet; gravel	.....	.....	3	1⅝″
9	Yellowish-gray sand, 75 per cent	64.0	11.0	70	20
	Gravel, 25 per cent	.....	.....	12	8
	The sample is from 64 feet; at 64 feet it is 10 per cent. fine gravel; the per cent. of gravel increases, being 30 per cent. at 69 feet.				
9 A	A sample from 69 feet	.....	.....	10	1¼″
10	Gray sand. From 85.2 feet to 87.1 feet the sand is darker.	75.0	12.1	60	20
11	Dark-gray sand, 10 per cent	87.1	3.3	70	20
	Gravel, 90 per cent	.....	.....	3	2⅝″
11 A	Pebbles from No. 11.				
12	Green sand shell-marl. The color—dull green—is quite uniform. The shells or fossils are fragile—no perfect ones were found. The boring ended at 96.8 feet.	90.4	.....	.....	.....

Respectfully submitted.

E. H. WILSON,
Assistant, in charge.

First Lieut. SMITH S. LEACH,
Secretary Mississippi River Commission.

VICINITY OF LAKE PROVIDENCE, LOUISIANA.

BORING No. 1.

The party reached Meyersville from the Choctaw Bar Reach at 12.30 p. m. of the 18th of March, 1880. Rain interfering, work was not commenced until the following morning. The quarter-boat left at 4.30 p. m. of the 20th.

The similarity of the lower clay to the lignitic clay of the earlier borings is marked. No green sand or shell remains were found.

No.	Notes and analysis.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Surface soil, brownish clay; contains rootlets	0.0	0.4	2,500	1,000
2	Light-brown sandy clay; contains iron-rust colored streaks.	0.4	5.6	2,500	800
3	Dark lead-colored clay	6.0	24.1	<3,000	.....
	At 6 feet this layer is dark blue sandy clay; at 6.5 feet dark lead-colored clay, containing brownish streaks, decayed vegetation; at 10 feet clay of a brownish-yellow color occurs with lead-colored clay. This brownish-yellow color is found between 10 and 19.6 feet, but is most apparent at 14.6 feet. At 15.2 feet the clay is lead-colored, thence it is darker and contains decayed vegetation. At 19.8 feet the clay is brown from the presence of vegetable matter. A piece of wood occurred at 8.2 feet.				
3 A	Clay from 19.8 feet.				
4	Dark-gray quicksand	30.1	17.9	100	40
	Contains particles of lignite wash. Become slightly coarser on descending. Specimens 5, 5 A, 6, 7, and 8 are a continuation of this layer.				
5	Dark-gray quicksand 85 per cent	48.0	20.8	80	20
	Gravel 15 per cent	.....	.....	4	1¼″
	From 48 to 57 feet it is 20 per cent. gravel, thence it is 10 per cent. gravel.				
5 A	A sample from 57 feet; gravel	.....	.....	3	1⅝″
6	Dark-gray quicksand	68.8	9.4	150	50
7	Dark-gray quicksand, 95 per cent	78.2	15.8	100	20
	Gravel, 5 per cent	.....	.....	15	2
8	Dark-gray quicksand	94.0	9.7	125	50
9	Dark-gray sand, 10 per cent	103.7	4.1	80	20
	Gravel, 90 per cent	.....	.....	5	>2½″
9 A	Pebbles from No. 9.				
10	Gray sand, 55 per cent	107.8	10.8	60	20
	Gravel, 45 per cent	.....	.....	12	3″
	It is 20 per cent. gravel to 110 feet, thence it is 50 per cent. No large pebbles occurred from 107.8 to 110 feet.				
10 A	A sample from 115 feet; gravel	.....	.....	8	3″
10 B	Pebbles from No. 10.				
11	Brownish-gray clay	118.6	.....	3,000	.....
	At 123 feet it is light greenish-gray clay, but changes to brownish-gray clay at 123.8 feet. It becomes sandy and softer at 123 feet and changes to stiff clay at 131 feet. Traces of lignitized vegetation occurred throughout the layer. The boring ended at 132.9 feet.				

Respectfully submitted.

E. H. WILSON,
Assistant, in charge.

First Lieut. SMITH S. LEACH,
Secretary Mississippi River Commission.

BORING No. 2.

The party reached Lake Providence, La., at 6 a. m. of March 21, 1880; commenced work upon the boring the following morning, and completed it on the 29th.

The high winds prevailing thereafter until the 4th of April prevented our departure for Hays' Landing, Miss., until 1.30 p. m. of the latter date.

The greatest depth that the party has ever attained in one day's work was accomplished in ten hours' labor in this boring. The derrick, tools, and pipe were carried across the levee, a distance of 200 feet, and the tubing was sunk 116.8 feet.

At 131.1 feet an accident, similar to that described in the report upon boring No. 2 of the Memphis Reach, befell us. In this instance, however, but little time was lost in the endeavor to bring up the lost pump through the pipe. After ascertaining that its end had been distorted, the pump was fouled within the pipe, which was then pulled up and the pump taken out of a joint at the surface of the ground.

Owing to the clayey consistency of the alluvial layers at this point the hole caved but little on the withdrawal of the pipe, and, in consequence, but little time was lost in resinking.

This clayey character of the material in and below the alluvium greatly decreased the usual frictional resistance at the surface of the tubing, and, in consequence, the 3-inch pipe was turned down to a depth of 238 feet (50 feet further than ever before), with a comparatively small torsional strain; unfortunately, at this depth our supply of 3-inch tubing was exhausted, or we could have continued indefinitely.

The 2-inch pipe was now lowered, but the incoherent tertiary sand had risen 20 feet in the 3-inch tubing, and the greatest difficulty was experienced in forcing our way through this material and 10 feet beyond the shoe of the 3-inch pipe, at which point the further progress of the 2-inch pipe was stopped by the binding force of the sand between the surfaces of the tubing and by the inflow of sand from the tertiary layer at or below 248 feet.

Notwithstanding the fact that a 12-foot pump was manufactured to overcome the effects of this constant tendency to rise within the 2-inch pipe, the level of the sand could not be reduced below a point 15 feet above the shoe of the pipe, and the boring was reluctantly abandoned at a depth greater by 23 feet than in any boring previously made by the party.

A characteristic feature of the alluvion displayed by the results of this boring is the nature of the deposits toward the lower end of cut-off bends.

The boring is located at the lower end of Lake Providence, on ground which, though now of about the elevation of the surrounding country, has been built up, since the river abandoned the course now marked by the lake, upon a coarse gravel bed to a height of 109 feet with layers of finely comminuted silica, which carry sufficient alumina, as a cementing material, to receive, generally, the name of clay beds.

The great number of laminæ in many of these layers would seem to indicate a great age for the Lake of Providence.

At a depth of 96.5 feet gas was noticed bubbling up around the outer surface of the tubing, which proved inflammable; its amount increased perceptibly as we approached the bed of lignite at 127.6 feet, and was noticed to a depth of 171 feet, when the supply failed to reach the surface through the tubing.

As a product of the lignite bed, it is probably "marsh gas."

The tertiary strata found below the bed of lignite marking the limit of scour of the glacial stream are generally similar to the sand and clay beds found in like position in the borings made near Plum Point, under the direction of Major Suter, in 1879. Comparison of the specimens will determine the differences which, though slight, are believed to exist.

The most noticeable difference is their lesser degree of coherence or compactness, which, in the Plum Point borings, was sufficient to counterbalance the tendency to rise in the pipe, while in this boring it seemed in some of the tertiary sands to be no greater than that of the alluvial sands. A statement that has been omitted in recent reports, to avoid repetition, is made here, viz, that all alluvial layers observed show material of diameters less than 3,000 to the inch.

No.	Apparently before drying.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Light-colored sandy loam	0.0	2.8	600	100
2	Blackish-brown clay-gumbo	2.8	0.7	>3,000	500
3	Yellowish-brown sandy clay. With rusty spots throughout; clay only in consistent appearance—in reality fine sand.	3.5	2.7	1,500	500
4	Light, brownish-yellow sandy clay. With but slight coherence.	6.2	3.4	1,000	300
5	Dark, bluish clay. Decaying rootlets (apparently) have left rusty streaks. A vertical cylinder was noticed, one-half inch in diameter, filled with very fine clear sand.	9.6	6.0	3,000	500
6	Dark, bluish-gray clayey sand, or sandy clay. Brought up in a semi-liquid condition, approaching quicksand in appearance. It becomes a hard and compact mass on drying.	15.6	5.8	800	200

No.	Apparently before drying.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
7	Clay having more consistency than the preceding layer, owing to very stiff clay laminæ. The layer may be considered as made up of an indefinite and indeterminable number of thin, fine, clay leaves, shading into very fine sand. Each lamina is from $\frac{1}{4}$ to $\frac{1}{100}$ of an inch or less in thickness. This is not apparent at first, but after a short exposure to the sun, as the more sandy or lower part of the thin layer dries out first, its difference in color, as compared with the upper or finer part of the layer, is clearly seen. Between 28 and 29 the clay is more uniformly sandy.	21.4	7.6	1,500	300
8	Bluish, lead-colored clay. Brought up after vigorous churning, in a putty-like condition.	29.0	1.0	3,000	.....
9	Very fine bluish-gray clayey sand, or sandy clay. About one-third of the contents of each pumpful was lumps of sandy clay, from $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter, floating in a semi-liquid, almost quicksand; indicating a great many layers, which could be neither located nor measured.	30.0	12.9	1,000	250
10	Dark, bluish-gray colored clayey sand. Sample taken at 42.9. It graduates into a coarser, though still a fine sand, at 54.8, where sample 10 A. was taken.	42.9	13.1	500	100
10 A.	Fine sand, at 54.8.	.....	.....	150	50
11	Dark-colored sandy clay; represented by samples taken at various depths. (No No. 11 sample.)	56.0	53.0	.....	.....
11 A.	Uniform in size of particles	56.0	24.0	800	300
11 B.	A dark purplish tinge obtains; made up of an indefinite number of laminæ, 200 to an inch.	80.0	2.3	1,500	300
11 C.	Dark, leaden-gray colored clay; stiffer than the preceding. Sand pencilings indicate a slow growth.	82.3	1.7	2,000	500
No sample.	Clay lacks consistency; almost sand in appearance as in reality; dark colored.	84.0	2.4	800	500
Do...	Same as above, but stiffer	86.4	1.6	1,500	1,000
Do...	Very dark gray clay	88.0	2.0	1,500	1,000
Do...	Lighter and more sandy	90.0	10.5	1,000	500
11 D.	Light, purplish-tinged sandy clay; changes gradually	100.5	0.5	2,000	300
11 E.	into dark purplish-tinged sandy clay	101.0	2.2	1,000	200
11 F.	Light, dove-colored clay. Change is abrupt from the preceding layer.	103.2	0.8	3,000	1,000
No sample.	Dark sandy clay	104.0	3.5	1,500	500
Do...	Dark-colored stiff clay, with a light purplish tinge	107.5	1.5	2,500	500
12	Gravel layers; represented by the following samples	109.0	18.6	.....	.....
12 A.	Coarse gravel; little or no sand	109.0	0.5	1	2½″
12 B.	Sand and mud, 5 per cent	109.5	7.0	.....	.....
	Gravel, 95 per cent	.....	.....	2	3½″
12 C.	Sand, 25 per cent	116.5	7.5	30	20
	Gravel, 75 per cent	.....	.....	3	1½″
12 D.	Sand, 50 per cent.; fine	124.0	3.6	150	20
	Gravel, 50 per cent.; fine	.....	.....	5	2″
12 E.	Gravel specimens from between 109.5 and 118.6 feet	.....	.....	.....	.....
12 F.	Gravel specimens from between 118.6 and 124 feet	.....	.....	.....	.....
13	Lignite; dark brown. It is very impure between 127.6 and 128 feet; thence to the bottom of the layer there is but little clay. The specimen preserved represents the most clayey part of the layer below 128 feet, and also all that was not reduced to paste under the action of the pumps and mixed with clay washings from above.	127.6	3.9	.....	.....
14	Clay	131.5	59.5	.....	.....
	Gray-colored clay, with rootlets from lignite bed	131.5	1.0	>3,000	.....
	Clay is friable on account of the presence in excess of light gray micaceous sand.	132.5	2.5	1,000	200
	The clay grows stiffer from 134 to 143.2 feet, though with several layers lenticular-shaped deposits of sand are frequent. The most noticeable instance is at 136 feet.	134.0	9.2	2,000	500
	Ferruginous sand concretions occur at 133, 135, 143, and 150.6 feet of about ½ inch in diameter. Between 143.2 and 143.4 feet the clay is of a rich seal-brown color, changing abruptly from a leaden hue, thence to 146.2 feet a light brown color prevails and the clay is quite sandy; between 146.2 and 147 feet a dark brown color is found.	143.2 143.4	0.2 2.8	1,800 1,500	500 300
	At 147 feet it changes abruptly into a fine clay with a light olive-green cast, which, on drying, changes to a light pea-green color.	147.0	4.4	3,000	1,000

No.	Apparently before drying.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
	This color continues to 151.4 feet, when the color becomes slightly brownish again to 155.8 feet; thence gray and sandy to 157 feet; thence to 159 feet stiff, fine, gray clay is found.	154.4 155.8 157.0	4.4 1.2 2.0	3,000 1,000 2,000	1,000 300 300
	Between 154 and 155 feet traces of lignitized vegetable matter—leaves apparently—are seen.	.....	.....	.....	.....
	Between 159 and 160 feet the clay is more sandy; at 159 feet lignitized leaves are seen. The material of these thin lignitic partings displays but little, and often no vegetable structure; but faint evidence of leaf tracery has been distinguished, though not sufficiently complete to refer to identifying flora.	159.0	1.0	1,500	300
	Between 160 and 161.2 feet the clay is very stiff and of a lighter shade of gray than that preceding.	160.0	1.2	3,000	500
	Between 161.2 and 170 feet a sandy clay prevails..... At 161.2 feet it is slightly micaceous to 165 feet, where a small amount of limestone was found.	161.2	8.8	1,000	300
	Between 170 and 191 feet the material came up as a sandy paste, receiving the name of clay rather than sand, on account of its slight degree of coherence.	170.0	21.0	800	200
14 A.	Fragments of limy concretion found at 165 feet. No duplicate.	.....	.....	.....	.....
14 B.	Sample of micaceous sandy clay, or clayey sand taken at 170 feet; the point in layers between 161.2 and 191 feet where the most sandy specimens were observed.	170.0	.....	500	200
15	Sand..... Fine gray sand with a slightly brownish cast as the result of the presence of very fine material, of that color, which affords a muddy wash on the emptying of the sand pump. This, with all the succeeding samples from the sand beds, shows a few scales of white mica.	191.0	6.5	300	100
15 A.	Fine gray quicksand, slightly brown when wet.....	197.5	31.5	100	50
15 B.	At 229 feet a thin layer of clayeysand (preserved as specimen No. 15 E) overlaid a bed of cleaner and, therefore, brighter sand, which strongly resembles sand from the Tertiary beds at Plum Point.	.....	.....	.....	.....
15 C.	At 238 feet slightly muddy sand was found, which extended to 247.95 feet, and which differed from the preceding layer in having a slightly muddy-brown tinge and in being somewhat finer.	.....	.....	.....	.....
15 D.	A thin seam of fine gray clay is followed by a clayey sand, both together less than 0.05 foot in thickness (preserved as 15 F.), and from immediately beneath this a clean sand, similar to 15 B., was forced up into the pipe so continuously that the pumps could not secure a specimen in place.	248.0	.....	100	50
15 E.	Clay found separating layers in sand beds at 200, 218, and 229 feet. At 200 feet the dividing layer is a laminated clay shale—"soapstone."	.....	.....	.....	.....
15 F.	Dark clay found at 247.95 feet	.....	.....	.....	.....

Respectfully submitted.

E. H. WILSON,
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First Lieut. SMITH S. LEACH,
Secretary Mississippi River Commission.

BORING No. 2 A.

As a striking instance of the difference in the nature of alluvial deposits at points adjacent, the record of the material passed through, in sinking a well on the principal street of Providence, is preserved as a report on boring No. 2 A.

The well is situated at a point west-southwest of boring No. 2, a distance of 1,000 feet, more or less, and on the opposite side of the lake.

No specimens of the material met with were preserved.

It might be well to state the fact that the ground upon which the well is located is certainly older than the lake of Providence.

No.	Apparently before drying.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Yellowish, clayey silt, with the usual special differences in shade and texture, growing more sandy as the surface is left.	0.0	21.0	1,500	800
2	Dark-blue, sandy clay	21.0	7.0	1,500	500
3	Dark, clayey quicksand	28.0	7.1	300	
4	Gravel, with but little or no sand	35.1	2.9	1	2″
	The interstices in gravel bed are filled with mud which coats all the pebbles of the layer.				
5	Sand, 25 per cent. (muddy)	38.0	8.0	75	.....
	Gravel, 75 per cent. (muddy)			4	1″
6	Sand, 63 per cent	46.0	41.0	75	
	Gravel, 37 per cent	.....	.....	6	1½
	The sand grows cleaner on descending. The gravel amounts to 75 per cent. of the material of the layer at 46 feet, but, decreasing uniformly, disappears at 87 feet.				
7	Clean, gray sand	87.0	14.8	75	20
8	Sand, 40 per cent. (clean and bright)	101.8	12.2	50	20
	Gravel, 60 per cent. (clean and bright)	.....	.....	3	3½″

It would seem that if a plentiful supply of pure water could be obtained anywhere in the alluvion, that it might be looked for here, in layer No. 8.

The water, although found in abundance and tempting in its clearness, bears the disagreeable quality that all the waters of the formation are said to possess, a strongly iron taste.

The amount in this instance is sufficient to impart a rusty coat to the interior of any vessel in which it is placed in the space of half an hour.

The most palatable waters found in the bottom lands of the Mississippi are those saturated with vegetable impurities, found near the surface.

Respectfully submitted.

E. H. WILSON,
Assistant, in charge.

First Lieut. SMITH S. LEACH,
Secretary Mississippi River Commission.

BORING No. 3.

The party left Lake Providence on the afternoon of April 4, 1880, and reached Hays' Landing, Mississippi, on the following morning, when work upon the last boring of the expedition was commenced.

The boring was discontinued on April 10, and the pipe pulled up on the following morning, in order to get the quarter-boat Arkansas in readiness to enter the fleet of an over-due tow-boat, and proceed to Memphis.

The boring, which shows nothing of peculiar interest in the alluvial strata, discloses the marl, the feature of the lower depths in the Choctaw Bar and Greenville borings, resting upon the "northern lignitic" strata.

No.	Apparently before drying.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Brown sandy loam	0.0	0.6	1,000	500
2	Brown sandy clay	0.6	0.7	1,500	500
3	Light-brown, sandy clay	1.3	2.7	800	400
4	Brownish-black clay "gumbo'."	4.0	5.0	3,000	1,000
5	Sandy, brown-colored clay, with orange streaks and spots.	9.0	1.0	1,500	500
6	Clay, slightly darker and stiffer than No. 5	10.0	2.0	2,000	500

No.	Apparently before drying.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
7	Clay of various colors and degrees of fineness, represented by the following described layers. (No No. 7 sample)	12.0	40.8	.....	.....
7 A.	Leaden blue clay, made up of many thin laminæ, with sandy partings.	12.0	7.7	2,000	500
No sample.	Turns to dark sandy clay in which the sandy partings are thicker, judging from the amount of quicksand mixed with clay in pump.	19.7	4.4	1,000	300
Do...	Clay becomes stiffer and even in texture	24.1	3.2	2,000	1,500
Do...	Dark sandy clay, with quicksand	27.3	1.7	1,000	300
Do...	The clay is stiffer and of an indistinct purplish tinge; though made up of a number of laminæ, the sand is neither coarse enough nor in sufficient amount to permit the easy separation of the leaves.	.....	.....	.....	.....
Do...	Clay turns sandy and dark leaden-gray in color	30.0	6.5	1,000	500
Do...	The clay is somewhat less sandy than the above	36.5	1.5	1,500	1,000
7 B.	Dark sandy clay with quicksand, undoubtedly made up of a great many laminæ. Scales of mica are found, though sparingly, in this layer.	38.0	8.4	1,000	300
No sample.	Dark clay, stiffer than last, and more uniform in texture..	46.4	1.6	2,000	1,500
Do...	Dark sandy clay; several layers with sandy partings	48.0	1.1	1,200	500
7 C.	Clay turns to a purplish color	49.1	0.7	1,000	200
No sample.	Clay turns dark gray again, abruptly	49.8	3.0	1,000	300
8	Mud, 30 per cent. (or clayey sand)	52.8	4.0	500	.....
	Sand, 30 per cent. (or clayey sand)	.....	.....	50	.....
	Gravel, 40 per cent. (or clayey sand)	.....	.....	5	1″
9	Sand, 80 per cent	56.8	10.2	40	20
	Gravel, 20 per cent	.....	.....	10	½″
	This separation is owing to the arbitrary division of sand and gravel (20 diameters to an inch). The layer would ordinarily be called coarse sand with an occasional pebble from ¼ to ½ inch in diameter.				
10	Sand, 95 per cent. (gray)	67.0	8.0	40	20
	Gravel, 5 per cent. (gray)	.....	.....	10	2″
11	Sand, 40 per cent. (gray)	75.0	2.0	35	20
	Gravel, 60 per cent. (gray)	.....	.....	10	3″
12	Sand, 30 per cent	77.0	1.0	30	20
	Gravel, 70 per cent	.....	.....	4	¾″
	Gray. The sample was burnt slightly in drying, hence its reddish tinge.				
13	Sand, 5 per cent	78.0	4.5	25	20
	Gravel, 95 per cent	.....	.....	2	1½
14	Clay balls	82.5	0.1	1	2″
15	Sand, 75 per cent	82.6	0.2	125	20
	Gravel, 25 per cent	.....	.....	12	⅜″
	Sand is fine and dark, with a noticeable amount of fine lignite wash. No duplicate sample.				
16	Sand, 75 per cent. (gray)	82.8	1.2	50	20
	Gravel, 25 per cent. (gray)	.....	.....	10	1½″
17	Gray sand	84.0	3.0	80	40
	Uniform in size of particles.				
18	Sand, 75 per cent	87.0	11.0	75	20
	Gravel, 25 per cent	.....	.....	4	1¾″
	Gray. The sand grains are very uneven in size.				
19	Gray sand	98.0	1.5	125	50
20	Dark sand, 75 per cent	99.5	4.0	75	20
	Gravel, 25 per cent	.....	.....	2	2½″
	At 100.6 feet small pieces of decayed cottonwood were found. The sand grains are very uneven in size. The layer carries considerable muddy material.				
21	Gray sand, 90 per cent	103.5	2.5	50	20
	Gravel, 10 per cent	.....	.....	10	½″
22	Gray sand, 50 per cent	106.0	3.5	30	20
	Gravel, 50 per cent	.....	.....	10	½″
	Specimens Nos. 21 and 22, ignoring the arbitrary division between sand and gravel (20 d. to an inch) would be called coarse sand.				
23	Gray sand, 20 per cent	109.5	1.2	25	20
	Gravel, 80 per cent	.....	.....	¾″	2½″
	20, 21, 22, 23, all seemed to be layers with abrupt transition; no merging of one into the other.				
23 A.	Large specimens of gravel from layer. One mineral specimen is a mass of sand and gravel held together firmly by a calcareous cement. No duplicate.				
24	Marl	110.7	40.0	.....	.....
	At 110.7 feet the marl is of a light pea green color, grows lighter in shade to 120.4 feet. The sand particles are not visible as such, and the layer is unusually				

No.	Apparently before drying.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
	and strongly effervescent. The layer offers considerable resistance to the pump. At 120.4 feet a small amount of a slightly darker, soapy substance is found, and beneath this green sand (glauconitic) occurs, sparingly at first, but increasing in quantity (and therefore lending a darker shade to the marl) to 127 feet, where it is in excess. This marl continues uninterruptedly to 150.7 feet. The shells are in great abundance throughout the layer, but are very friable, and it is difficult to obtain even partially satisfactory specimens. Some peculiarily-shaped brown siliceous and argillaceous concretion (?) occur toward the bottom of the layer. The limy concretions that were so plentiful on the Choctaw Bar Reach are few in numbers and very friable. One from 138 feet is preserved in duplicate box, No. 25.				
24 A.	Boxed specimens	110.7	16.3	.....	.....
24 B.	Dark from the excess of green sand material. Siliceous sand, probably 50 per cent or more.	127.0	50	125	.....
24 C.	Slightly lighter in color on account of the smaller amount of green sand mixed with the siliceous sand and shell remains.	132.0	13.0	150	.....
24 D.	Very dark in color. To be found in (box) No. 25	145.0	5.7	.....	.....
24 E.	Shells from between 114.7 feet and 137 feet. No duplicate.	.....	.....	.....	.....
24 F.	Shells and concretions, from between 145 feet and 150.7 feet.	.....	.....	.....	.....
25	Lignitic sands and clays	150.7	36.4+	.....	.....
	At 150.7 feet black lignitic clay, green sand and shell remains, pockets of fine white sand and very small crystals (?) of iron pyrites are preserved in one specimen, which clearly shows the plane of separation of the layers (24 and 25). Below this to 157.8 feet dark lignitic clay of all degrees of fineness and light siliceous sand seem to be interlaminated with a wave-like structure. At 156 feet the clay is rich in iron pyrites. From 157.8 feet the clay is more strongly lignitic to 158 feet, at	.....	.....	1,000	.....
25 A.	which point a clayey sand is found, continuing to 160 feet. From 160 feet, though still sandy, the material grows stiffer, until at 165.5 feet it is quite stiff and more strongly lignitic. Bits of lignite are visible to a depth of 166.5 feet, from which point the clay, which has been growing more sandy from 165.7 feet, comes	158.0	2.0	500	200
		at 165.5	.....	2,000	50
25 B.	up as a sandy paste and is preserved as sample 25 B. This clayey sand or sandy clay continues with the same dark gray color to 176 feet, where a brown hue was noticeable.	at 166.5	.....	300	100
25 C.	Brownish sandy material, quite clayey	176.0	5.2	500	100
	Any shell fragments or green sand discoverable (with the naked eye, at least) in samples 25 B. or 25 C., may be attributed to the marl layer above 150.7 feet, as the boring below that point was not sheathed. At 181.2 feet the clay becomes stiff and dark, and with its wavy lines of lamination looks, when freshly cut, like polished mahogany; this continues to 185.1 feet where the boring ended.				

Respectfully submitted.

E. H. WILSON,
Assistant, in charge.

First Lieut. SMITH S. LEACH,
Secretary Mississippi River Commission.

DISTRIBUTION OF LABOR.

Reach.	No. of boring.	Time spent in actual work at derrick, and on loading and unloading equipment.	Time lost on account of rain, &c., during working hours, spent in repairs of tools, &c.	Time outside of working hours during progress of work.	Time spent in motion between borings.	Time during daylight lost on account of rain, fog, and wind while in transit between borings, spent in repairs to tools, &c., including holidays.	Hours of night intervening.	Total time in hours.	Total time in days and hours.	
		Hours.	*Hours.*	*Hours.*	*Hours.*	*Hours.*				
Memphis	1	25	0	46	41	25	33	170	7	2
Memphis	2	112	21	231	1	8	37	410	17	2
Memphis	3	30	0	36	3	4	27	100	4	4
Memphis	3*a*	8	0	0	4	0	26	38	1	14
Helena	1	64	0	108	19	0	11	202	8	10
Helena	2	63	0	108	6	16	47	240	10	0
Choctaw Bar	1	47	1	72	43	21	54	238	9	22
Choctaw Bar	2	52	5	102	3	0	5	167	6	23
Choctaw Bar	3	26	2	65	10	3	12	118	4	22
Choctaw Bar	4	26	0	29	5	2	12	74	3	2
Choctaw Bar	5	31	6	80	3	0	0	120	5	0
Greenville	1	14	29	42	13	14	30	142	5	22
Lake Providence	1	18	5	28	12	0	12	75	3	3
Lake Providence	2	80	0	148	4	0	10	242	10	2
Lake Providence	2*a*	0	0	0	0	0	0	0	0	0
Lake Providence	3	59	9	116	7	55	72	318	13	6
Total	.....	655	78	1,211	174	148	388	2,654	110	14

During this trip there were of holidays 18
Of working days ..... $110\frac{8}{12}$

Work at derrick, ten hours per day, boring ..... $65\frac{5}{10}$
Time at derrick lost ..... $7\frac{8}{10}$
Floating, twelve hours per day ..... $14\frac{6}{12}$
Time lost on account of inclement weather while moving ..... $12\frac{4}{12}$

$100\frac{16}{120}$

Holidays occurring during moves, charged in time of floating or lost ..... $7\frac{56}{120}$
Working days between readiness to leave Mound City and completion of work and disbandment of party at Hays' Landing, Miss ..... $92\frac{8}{12}$

Boring ..... $73\frac{3}{10}$ = 73.33
Moving, outside of holidays ..... $19\frac{44}{120}$ = 19.37

Percentage of time occupied in work at derrick ..... $79\frac{1}{10}$
Percentage of time occupied in moving ..... $20\frac{9}{10}$

100

Location, &c., of tertiary strata in reference to the surface of the alluvion.

Reach.	No. of boring.	Depth of alluvium.	Depth of alluvium referred to H. W. M. (appendix).	Depth of Tertiary strata penetrated.	Depth of boring.	Character of the Tertiary layers immediately beneath the alluvium.	Color and texture of the Tertiary deposits at the point separating alluvium therefrom.
		Feet.	*Feet.*	*Feet.*	*Feet.*		
New Madrid	9	110.5	107.0?	103.5	214.0	Lignitic clay	Light gray and sandy.
New Madrid	15	68.0	91.7	33.0	101.0	....do	Dark brown, hard and tough.
New Madrid	18	137.6	118.8	70.4	208.0	....do	Blue brown, laminated, hard and tough.
New Madrid	21	203.7	200.1	3.3	207.0	....do	White sand of the lowermost group of Tertiary.
New Madrid	6	107.0	107.8?	23.0	130.	....do	Porter's C'k (Safford), or brown (?) Flatwoods (Hilgard).
Plum Point	9	150.2	150.4	49.8	200.	....do	Brown.
Plum Point	11	151.0	160.4	56.6	207.6	Lignite	Black.
Plum Point	34	110.1	111.6	61.2	171.3	Lignitic clay	Blue.
Plum Point	13	160.4	165.3	64.6	225.0	....do	Dark drab colored, sandy clay.
Plum Point	6	110.1	119.4	30.3	140.4	....do	Blue.
Plum Point	10	194.4	191.6	.....	194.0	.....	Did not reach bottom of alluvium.
Memphis	3	146.0	149.0	29.5	175.5	Lignitic clay	Sandy, bluish brown.
Helena	1	162.3	163.0	44.1	206.4	....do	Greenish blue.
Choctaw Bar	3	141.5	142.9	13.1	154.6	Marly clay..	Dark greenish blue, becoming brown on exposure.
Choctaw Bar	1	99.3	102.4	76.0	175.3	....do	Bluish brown.
Choctaw Bar	4	105.7	106.2	29.5	135.2	....do	Brown.
Choctaw Bar	2	121.3	124.6	63.9	185.2	....do	Bluish brown.
Choctaw Bar	5	109.0	111.6	37.4	146.4	Marly clay*.	Dark drab colored.
Greenville	1	90.4	88.4	5.4	96.8	Gem sand...	Pea Green.
Lake Providence	1	118.6	124.8	14.3	132,9	Lignitic clay	Greenish gray.
Lake Providence	2	127.6	131.4	120.4	248,0	Lignite	Dark brownish black.
Lake Providence	3	110.7	110.8	74.4	185.1	Shell marl.	Light pea green.

* Shell marl.

[Potter & Riggs, Mining and Metallurgical Laboratory, Washington University, Saint Louis, Mo.]

Certificate of analysis.

DEAR SIR: The clays (dried at 100 C.). marked as below, contain:

Reach.	No. of boring.	No. of sample.	Depth.		Combined water.	Total silica.	Sand.	Alumina and iron.
			From.	To.				
			Feet.	*Feet.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
Choctaw Bar	1	5	95.4	97.4	6.55	66.19	65.78	20.77
Choctaw Bar	5	1	0.0	1.0	4.42	77.46	82.77	11.24
Choctaw Bar	5	3	5.3	13.7	4.51	76.04	79.29	12.44
Choctaw Bar	5	4*a*	15.0	68.2	9.34	58.31	36.49	22.13
Choctaw Bar	5	12	109.	.....	10.88	51.29	37.53	28.08
Helena—Tertiary clay	2	.....	162.3	.....	7.90	69.30	70.90	19.19
Lake Providence	3	4	4.0	9.0	9.79	61.75	46.96	20.26
Lake Providence	3	7*c*	49.0	49.8	5.52	72.80	77.53	13.81

The sand in (No. 1, No. 5), (No. 5, No. 1), (No. 5, No. 3), Choctaw Bar, and Helena (No. 2), contains silicates not decomposed by acid or carbonate of soda.

(No. 1, No. 5), (No. 5, No. 3), Choctaw Bar, and (No. 3, No. 4), contains carbonic acid, probably combined with lime.

(No. 5, No. 1), contains a small amount of manganese.

Respectfully,

POTTER & RIGGS.

Mr. E. H. WILSON.

The amount of alumina in these alluvial clays is seen to be considerably greater in these samples (which contain ordinary averages) than in the similar clays found at New Madrid and Plum Point, in the borings of Maj. Charles R. Suter.

J 1.

LETTER OF MAJ. CHARLES R. SUTER, GIVING INFORMATION COLLECTED CONCERNING BORINGS MADE IN THE MISSISSIPPI VALLEY, BETWEEN CAIRO AND VICKSBURG, PREVIOUS TO THE ORGANIZATION OF THE COMMISSION.

SAINT LOUIS, MO., *November* 21, 1881.

GENERAL: In accordance with your request, I have collected all attainable information concerning borings of a reliable character made in the Mississippi Valley, below Cairo, and above Vicksburg, other than those made under the direction of the Commission.

In 1877, 1878, and 1879 seven borings were made under the direction of General Comstock, United States Engineers, and a description of them will be found in the reports of the Chief of Engineers, United States Army, for those years. The apparatus used was a modification of the ordinary drive-well. The location and depth of these borings was as follows: No. 1 at Cairo, depth 102 feet, ended in gravel; No. 2 at foot of President's Island, below Memphis, depth 98 feet, ended in sand; No. 3 on Tennessee shore at Horn Lake Bend, below Memphis, depth 76.5 feet, ended in sand; No. 4 on Mississippi shore at Harbert's Point, above Helena, depth 100 feet, ended in sand; No. 5 on sand-bar in Montezuma Bend, below Helena, depth 63 feet, ended in a log imbedded in sand; No. 6 on Arkansas shore, abreast of Montezuma towhead, depth 95 feet, ended in sand; No. 7 near Helena, depth 85 feet, ended on rock, was really a bluff section, as shown by comparison with boring No. 2 at Helena made by the Commission. None of these borings passed through the alluvial strata.

In 1879, upon the recommendation of the Board on low-water navigation of the Mississippi River, I was directed to organize a party for making borings along some of the shoal reaches of the river. The party were in the field about six months, and made a total of 60 borings, viz: 21 on New Madrid reach, and 39 on the Plum Point reach. These borings ran in depth from 80 feet to 220 feet, and 11 of them penetrated through the alluvial strata, while 3 were sections of the Fort Pillow and Randolph Bluffs. The party was organized by John W. Nier, assistant engineer, and the equipment of boring tools, &c., was prepared by him. He was assisted by recorders Wilson, Weir, and Primm. Towards the close of the season Assistant Nier returned to his station at Kansas City, and Assistant Wilson took charge of the party. I append a report from Assistant Nier descriptive of the boring apparatus, which is the same that was subsequently used by Assistant Wilson in his work under the Commission.

Maps, showing the location of these borings, together with sections and copies of the field analysis, are furnished herewith. It will be seen that the ground was pretty thoroughly covered, and every endeavor was made to throw as much light as possible upon this important subject. Borings were made along the banks and in the bed of the stream, and several were located at as long distances from the river as was possible with due regard to facilities of transportation and supply. The most important of these borings are discussed by Assistant Wilson in connection with those made subsequently under the direction of the Commission at other points along the river.

I am, general, very respectfully, your obedient servant,

CHAS. R. SUTER,
Major of Engineers, U. S. A.

General Q. A. GILLMORE,
President Mississippi River Commission.

VICINITY OF NEW MADRID.

BORING NO. 1.

No.	Apparently before drying.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Sandy loam	0.0	1.5	<3,000	.....
2	Sandy clay	1.5	2.3	<2,000	1,000
3	Fine yellow sand	3.8	3.2	150	80
4		7.0	19.0	100	50
5		26.0	4.7	50	>20
	The finest sand was on top and the specimens grew uniformly coarse.				
6	Gravel 75 per cent	30.7	8.2	5	¾′,
	Coarse sand 25 per cent	.....	.....	30	20
7	Lignite, broken by pump	38.9	0.4	.....	.....
8	Gray fine sand	39.3	0.4	200	40
9	Lignite	39.7	0.3	.....	.....
10	Very coarse sand	40.0	0.5	50	>20
11	Sand 50 per cent	40.5	12.5	50	>20
	Gravel 50 per cent	.....	.....	6	.....
12	Sand 75 per cent	53.0	2.0	100	20
	Gravel 25 per cent	.....	.....	8	¾″
13	Gravel, but little sand	55.0	14.4	4	>12½″
14	Very fine sand	69.4	0.1	100	40
15	Blue clay	69.5	0.02	<3,000	.....
16	Sand	69.52	9.98	75	30
17	Gravel 50 per cent	79.5	17.8	10	.....
	Sand 50 per cent	.....	.....	50	20
18	Gravel 90 per cent	97.3	10.7	4	>1½″
	Sand 10 per cent	.....	.....	50	20
19	Coarse sand	108.0	1.3	60	20
20	Gravel, less than 10 per cent. sand, though undoubtedly sediment was washed out and suspended in water	109.3	2.9	3	>1½″
21	Coarse sand	112.2	2.2	40	20
22	Sand 30 per cent	114.4	5.4	40	20
	Very large gravel 70 per cent	.....	.....	>1¾″	>2″
23	Very fine white sand	119.8	18.4	100	30
24	Blue clay	128.2	1.3	<3,000	.....
25	White sand	129.5	2.1	50	30
26	Blue clay	131.6	0.02	<3,000	.....
27	Gravel 20 per cent	131.62	5.78	8	½″
	White sand 80 per cent	.....	.....	60	20
28	Gravel 60 per cent	137.4	2.9	3	1½″
	White sand 40 per cent	.....	.....	50	20

Whenever gravel has been found there have been some specimens too large to enter pump valves, which have come up broken. From this fact it is not possible to determine size of stones accurately, and the size, as given, can only be approximately correct.

Respectfully submitted.

J. W. NIER,
Assistant, in charge.

Maj. CHARLES R. SUTER,
Corps of Engineers, U. S. A.

BORING No. 2.

No.	Apparently before drying.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Surface soil, sandy loam	0.0	0.5	1,500	1,000
	N. B. Capable of subdivision by rubbing. Vegetable matter present.				
2	Sandy loam	0.5	0.9	1,500	1,000
3	Sand; about same fineness as two previous samples; scaly	1.4	17.3	1,500	1,000
4	Clay; sandy when dried	18.7	0.2	3,000	1,000
5	Gravel	18.9	3.4	.....	1″
	Sand	.....	.....	200	.....
	Conglomerate pebbles. For proportions see samples.				
6	Gravel; one stone 2½ inches	22.3	5.3	.....	2½″
	Sand	.....	.....	200	20
7	Gravel, sand	27.6	1.0	.....	1″
	Fragments of pudding stone; several inches wide, about 1 inch thick; also chalk pebbles, 1 inch.*				
8	Gravel. Gravel in this stratum is mixed with lignite	28.6	8.6	.....	1½″
	Sand	.....	.....	300	100
9	Gravel. For proportions see sample	37.2	4.2	.....	1′
	Sand	.....	.....	200	50
10	Gravel. For proportions see sample	41.4	7.6	.....	2½″
	Sand	.....	.....	.....	.....
11	Gravel. For proportions see sample	49.0	3.4	.....	¾″
	Sand	.....	.....	.....	.....
12	Gravel and sand; finer portions washed into 11	52.4	0.5	.....	¾″
13	Gravel and sand; graduation of sizes; about same as two previous	52.9	>1	.....	1,000
14	Gravel and sand; graduation of sizes; about same as two previous	60.0	12.8	50	.....
15	Gravel and sand; sand graduated to gravel	72.8	1.8	10 100	1″ <1,000
16	Gravel	74.6	15.2	.....	10
	Sand	.....	.....	200	50
17	Gravel. Largest samples jasper	89.8	13.6	.....	1½″
	Sand	.....	.....	.....	.....
18	Sand. This sample was washed from No. 19	93.4	0.3	200	1,000
19	Gravel; finer portions washed into 18	93.7	4.3	.....	¼″
20	Sand	98.0	11.8	100	50
21	Gravel	109.8	0.4	.....	½″
22	Gravel. Gravel scattered through stratum	110.2	6.6	.....	1″
23	Gravel. Gravel stratum well defined	116.8	4.6	.....	1″
	Sand	.....	.....	200	50
24	Gravel	121.4	1.0	.....	1″
	Sand	.....	.....	.....	50
25	Sand. Small gravel scattered through this stratum	122.4	2.6	300	100
	This boring was abandoned at a depth of 125 feet because of an accident.				

*Chalk pebbles mentioned in 7 do not appear in bottles, because they powder when dried.

Respectfully submitted.

J. W. NIER,
Assistant, in charge.

Maj. CHARLES R. SUTER,
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BORING NO. 3.

No unusual difficulty was met with in this boring. Arrived within 300 yards of selected location at noon March 7, on steamer Vint Shinkle from New Madrid. There was no water at designated location, and as a clearing through cane and fallen timber was necessary both to erect derrick and camp, and to reach the desired spot, concluded, as the country along bank was a formation of the same age apparently, to make boring at the within-named spot. A table of diameters is attached which explains itself. Have designated the material as what it appears to eye in bringing it to surface. It will be observed that several bottles contain specimens from different depths. The difference both to the eye before and under the microscope after drying was not distinguishable. Finished boring at 11 a. m., March 12, and lowered derrick by 1 p. m. the following day.

No.	Apparently before drying.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Sandy loam	0.0	1.1	2,000	.....
2	Same; more sand	1.1	3.4	800	200
3	Brownish clay	4.5	9.5	<3,000	2,000
4	Coarse yellow sand	14.0	13.5	300	100
5	Blue clay	27.5	0.2	.....	.....
		31.6	0.2	3,000	2,000
6	Blue quicksand	27.7	3.9	.....	.....
		31.6	0.6	200	100
7	Blue clay	32.2	1.0	3,000	2,000
8	Coarse sand; a little gravel	33.2	9.7	80	20
9	Blue clay	42.9	7.1	.....	.....
		53.8	1.0	.....	.....
		56.0	2.0	.....	.....
		64.0	0.8	3,000	2,000
10	Blue quicksand	50.0	3.8	.....	.....
		54.8	1.2	.....	.....
		58.0	6.0	250	100
11	.....do	64.8	4.2	300	150
12	Coarse sand; a little gravel	69.0	1.8	20	1/4"
13	Gravel { 50 per cent. sand	.....	.....	80	20
	{ 50 per cent. gravel	70.8	4.0	>3/4	>2 1/4"
14	Sand	74.8	4.2	100	20
15	Sycamore log; no bark; horizontal	79.0	0.8	.....	.....
16	Gravel { 50 per cent. sand	.....	.....	80	20
	{ 50 per cent. gravel	79.8	14.7	>1/4"	2 1/4"
17	Coarse sand	94.5	29.9	100	20
18	Gravel { 25 per cent. sand	.....	.....	100	20
	{ 75 per cent. gravel	124.4	5.1	1"	>2"
19	Sand	129.5	.....	250	50

Respectfully submitted.

J. W. NIER,
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Maj. CHARLES R. SUTER,
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BORING No. 4.

No.	Apparently before drying.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Surface soil, sandy loam	0.0	1.2	200	100
2	Sandy loam	1.2	1.2	500	300
3	Yellow clay	2.4	0.9	1,000	1,000
4	Blue clay; considerable variation in color	3.3	16.5	1,500	1,000
5	Blue clay	19.8	1.4	3,000	2,000
6	Quicksand { Red	.....	.....	300	100
	Quicksand { Brown	21.2	1.1	500	10
	This stratum contained a vein of blue clay $\frac{1}{10}$ inch; from upper surface, $\frac{8}{100}$ inch.				
7	Sand, 75 per cent	22.3	6.3	.....	$\frac{3}{4}''$
	Gravel, 25 per cent	.....	.....	500	20
8	Blue clay	28.6	0.8	2,000	1,500
9	Gray sand; 2 per cent. scattered gravel, $\frac{1}{8}$ inch to $\frac{1}{3}$ inch in diameter	29.4	5.4	200	100
10	Sand, 60 per cent	34.8	1.6	10	$\frac{5}{8}''$
	Gravel, 40 per cent	.....	.....	100	200
11	Sand	36.4	4.8	100	12
12	Blue quicksand	41.2	1.0	100	50
13	Blue clay; too fine for determination	42.2	0.7	<3,000	2,500
14	Quicksand	42.9	2.9	200	100
15	Sand, 50 per cent	45.8	8.6	100	100
	Gravel, 50 per cent	.....	.....	8	2
16	Sand	54.4	21.6	100	20
	Gravel	.....	.....	15	1''
17	Sand	76.0	22.4	100	20
	Gravel	.....	.....	8	$\frac{3}{4}''$
18	Yellow sand, 95 per cent	98.4	3.8	100	20
	Gravel, 5 per cent	.....	.....	10	4
	Some portions of sand > $\frac{1}{10000}$ inch.				
19	Yellow and blue clay; too fine for measurement	102.2	0.3	.....	.....
20	Sand, 70 per cent	102.5	1.0	100	20
	Gravel, 30 per cent	.....	.....	10	$1\frac{1}{2}''$
21	Sand, 95 per cent	103.5	5.1	100	20
	Gravel, 5 per cent	.....	.....	10	4
22	Sand, 30 per cent	108.6	8.1	50	20
	Gravel, 70 per cent	.....	.....	4	$1\frac{1}{2}''$
23	Sand, 70 per cent	116.7	1.0	100	20
	Gravel, 30 per cent	.....	.....	10	$\frac{3}{4}''$
24	Sand, 20 per cent	117.7	4.5	100	20
	Gravel, 80 per cent	.....	.....	5	$\frac{8}{10}''$
25	Gravel	122.2	1.8	$\frac{35}{100}''$	$\frac{7}{10}''$
	Quicksand	.....	.....	200	100
	For proportions, see samples.				
26	Quicksand; same as No. 25, with no gravel	124.0	12.0	200	100
27	Quicksand, 40 per cent	136.0	1.0	200	100
	Gravel, 60 per cent	.....	.....	10	2
	Finer portions of Nos. 25, 26, and 27 the same.				
28	Quicksand, 20 per cent	137.0	2.2	200	100
	Gravel, 80 per cent	.....	.....	10	2
	Same as 27, with proportion of gravel increased.				
29	Brown quicksand; very uniform in color	139.2	4.5	400	25
30	Brown quicksand, 50 per cent	143.7	1.3	400	25
	Gravel, 50 per cent	.....	.....	5	1''
31	Lignite	145.0	2.7	.....	4
	Sand	.....	.....	100	300
32	Sand	147.7	0.7	100	300
	Gravel	.....	.....	.....	1''
33	Sand	148.4	3.8	1,000	300
	Gravel	.....	.....	10	5
34	Bottom sample not a good sample, because of great discharge of water.	152.2	.....	.....	.....

N. B.—Between Nos. 30 and 31 a vein of blue clay was passed through whose thickness could not be determined, certainly not over $\frac{25}{100}$ inch thick, same quality as No. 13.

Respectfully submitted.

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BORING No. 5.

No.	Apparently before drying.	Location of layers.		Diameters to an inch.	
		Depth.	Thick. ness.	Average.	Great- est.
		Feet.	*Feet.*		
1	Sandy loam	0.0	0.9	300	100
2	Brown clay	0.9	5.0	1,000	200
3	Light sand	5.9	1.2	500	180
4	Gumbo or clay	7.1	1.5	2,000	1,000
5	Sand	8.6	29.9	200	50
6	Gravel { sand, 30 per cent	38.5	1.3	50	20
	{ gravel, 70 per			7	>1
7	Sand	39.8	2.8	80	30
8	Sand and gravel { sand, 80 per cent	42.6	1.5	80	30
	{ gravel, 20 per cent			5	>1¼″
9	Sand	44.1	2.3	120	50
10	Gravel { sand, 50 per cent	46.4	10.1	30	20
	{ gravel, 50 per cent			4	>1¼″
11	Sand	56.5	2.3	80	20
12	Sand	58.8	5.7	120	20
13	Sand { sand, 85 per cent	64.5	4.5	75	20
	{ gravel, 15 per cent			6	⅛″
14	Gravel { sand, 25 per cent	69.0	0.4	75	20
	{ gravel, 75 per cent			1¼″	>2½″
15	Sand	69.4	4.9	40	20
16	Sand	74.3	2.7	100	40
17	Gravel { sand, 50 per cent	77.0	5.0	100	20
	{ gravel, 50 per cent			6	½″
18	Gravel { sand, 20 per cent	82.0	6.0	50	20
	{ gravel, 80 per cent			4	¾″
19	Sand { sand, 80 per cent	88.0	1.0	40	20
	{ gravel, 20 per cent			12	¼″
20	Gravel { sand, 25 per cent	89.0	5.3	40	20
	{ gravel, 75 per cent			7	>½
21	Gravel { sand, 50 per cent			50	20
	{ gravel, 50 per cent	94.3	5.7	2	>2½
22	Sand	110.0	10.0	100	30

Every specimen had sand finer than could be measured on micrometer scale—3,000 to an inch. This was so fine that after drying it would float off in air as dust. The proportion of this material in specimens could not be determined. It was, however, greatest, excepting in clay, in gravel beds. After leaving depth of 8.6 feet no clay in beds was found, though the existence of light layers on top of finest sand layers was suspected. No blue-colored material was met with.

Respectfully submitted.

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BORING No. 6.

No.	Apparently before drying.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Surface sand and organic matter	0.0	3.6	50	16
2	Blue clay, stained with oxide iron	3.6	11.6	2,000	1,000
3	Quicksand	15.2	2.6	200	100
4	Blue clay	17.8	1.7	2,000	1,000
5	Gravel, 25 per cent	19.5	4.2	$\frac{1}{2}$	$2\frac{1}{4}''$
	Sand, 75 per cent	.....	.....	50	10
	Contained a jasper stone $2\frac{3}{4}$ by $1\frac{1}{4}$ by 1 inch.				
6	Blue clay and sand; differs from No. 2, in having no iron oxide stains.	23.7	3.1	1,000	50
7	Gravel, 20 per cent. Contained lignite $1\frac{1}{2}$ inch by $\frac{1}{4}$ inch	26.8	2.9	.....	$1\frac{1}{2}''$
	Sand, 80 per cent	.....	.....	50	20
8	Gravel, 5 per cent	29.7	3.6	$\frac{1}{8}''$	$1''$
	Sand, 95 per cent	.....	.....	100	20
9	Gravel, 5 per cent., with broken lignite	33.3	7.1	$\frac{1}{2}''$	$1''$
	Sand, 95 per cent	.....	.....	100	20
10	Gravel, 75 per cent	40.4	7.9	$\frac{1}{4}''$	$1''$
	Sand, 25 per cent	.....	.....	80	20
11	Gravel, 10 per cent	48.3	16.2	5	$\frac{7}{8}''$
	Sand, 90 per cent	.....	.....	50	20
12	Gravel, 70 per cent. Contained moss-agate gravel	64.5	10.5	$\frac{1}{4}''$	$1\frac{1}{4}''$
	Sand, 30 per cent	.....	.....	50	20
13	Cottonwood log	75.0	0.8	.....	.....
14	Gravel. Scattering	75.8	28.5	.....	$\frac{1}{2}''$
	Sand	.....	.....	50	10
15	Quicksand; gray	104.3	2.7	>1,000	60
16	Blue clay	107.0	19.2	<2,000	.....
17	Brown clay, with impression of leaves; was very hard on bringing to surface.	126.2	1.2	<3,000	.....
18	Quicksand	127.4	2.6	200	50
	A thin stratum of clay, similar to No. 6, about $\frac{3}{100}$ inch in thickness, was found between Nos. 7 and 8.				

Respectfully submitted.

_____,
Assistant, in charge.

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BORING No. 7.

Reached Dan Watson's at 10 a. m., March 21, from Lester's Landing, and were again on the bank ready to depart, Wednesday, 26th instant, at 4 p. m. The mechanical difficulties of this work were comparatively slight, one delay only occurring by the breaking of the thread of a joint of 2-inch pipe at 88.0 feet. Pulled up to 79 and replaced it. Great trouble, however, was experienced in the location of samples. Among the unrecorded strata are three, at least, very thin laminæ of sand between 3.5 and 20.5 (No. 4) and at 15.2, 17.8, and 19.3, hardly different from the overlying sandy clay, which it resembled in color, and to the eye in size of particles. The increase of coarseness was slight but uniform on descent. Between 39.0 and 46.8 fine sand and a very small proportion of white clay was found. The strata of clay could be neither located, measured, nor numbered, though there were at least four of them, as each of the four pumps brought up a small quantity collected in bottom. Before drying, these samples were of a milky whiteness, turning yellow on exposure. (See samples mixed with sand in No. 9.) In No. 10, in addition to small gravel, should be mentioned a flat stone 2 inches in largest dimension by $\frac{1}{2}$ inch in thickness. The bottom of each pump between 50.8 and 56.0 (No. 11) contained a very few large gravel and "chunks" of white clay, though proportion of both to amount of accompanying sand was very small, not 3 per cent. The existence of gravel and clay together suggests the idea that the white clay, which is quite heavy and tough, though moist, may exist as nodules in gravel bed.

In boring No. 1, while digging to recover pipe, a ball of yellow clay with gravel imbedded in surface was found in bed of sand at 12 feet. At boring No. 3 a nodule

of white clay was found imbedded in a stratum of blue clay. At 104.8 found a yellowish clay, though thin laminæ were blue. One "lump" three-fourths of an inch in diameter disclosed 25 distinct laminæ plainly discernible—some yellow, some blue. There was also some little whitish clay, more noticeable on account of its finer texture.

No. 20 shows a sandy clay, and No. 21 a clayish sand, probably the bottom of the first-named stratum. The clay came up as a somewhat stiffer paste than did the sand, though to the eye both seemed identical after a short exposure to the sun. The difference, however, is clearly seen under the glass. The gravel between 110.6 and 113.0 carried sand no different from that with which the water in pipe was laden, which, running into pipe from 107 and raising water level, was constantly brought up as sediment.

This gravel is shown without sand to indicate its difference in specific gravity as compared with the smaller though heavier specimens succeeding. At 120, pump went through gravel into bed of sand, which rose, instantly, more than 12 feet. Having exhausted our 2-inch pipe, boring No. 7 ended.

The surface of ground in "New Madrid Bend" can be described as rolling. Tradition ascribes this singular formation to the effect of the earthquake of 1811, the land before its visitation being flat and subject to overflow. Boring was located at foot of sand ridge, in what to appearances was the bed of a dry slough.

No.	Apparently before drying.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Black vegetable mold	0.0	0.4	.....	.....
2	Yellow clay	0.4	2.0	1,500	1,000
3	Very fine sand	2.4	1.1	250	100
4	Yellow sandy clay	3.5	17.0	500	200
5	Dark gray sand	20.5	3.5	150	80
6	Sandy clay	24.0	0.4	1,000	200
7	Sand	24.4	8.4	150	75
8	Coarse sand	32.8	6.2	50	20
9	Sand	39.0	7.8	100	30
	Thin laminæ of white clay	.....	.....	<3,000	.....
10	Sand	46.8	4.0	50	20
11	Sand	50.8	5.2	40	20
	Gravel	.....	.....	.....	1″
	White clay	.....	.....	<3,000	.....
12	Dark sand	56.0	9.0	100	20
13	Sand, 50 per cent	65.0	6.8	30	20
	Gravel, 50 per cent	.....	.....	10	1¼″
14	Light sand	71.8	11.2	100	30
15	Sand, 75 per cent	83.0	5.3	60	20
	Gravel, 25 per cent	.....	.....	12	1″
16	Sand, 65 per cent	88.3	4.1	40	20
	Gravel, 35 per cent	.....	.....	4	1¾
17	Dark fine sand	92.4	12.4	60	>20
18	White clay	104.8	0.5	3,000	.....
	Yellow clay	.....	.....	2,000	300
19	Sand, 90 per cent	105.3	1.7	200	20
	Gravel, 10 per cent	.....	.....	5	>1″
20	Yellow sandy clay	107.0	1.0	1,000	500
21	Yellow clayish sand	108.0	0.7	300	100
22	Whitish clay	108.7	0.1	2,000	300
23	Clay and fine sand	108.8	1.7	1,000	300
24	Broken gravel	110.5	2.5	2	>2″
25	Heavier gravel	113.0	7.0	4	>2″
26	Coarse sand	120.0	.....	40	>20
	Every specimen carries particles smaller than 3,000 to an inch.				

Respectfully submitted.

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BORING No. 8.

No.	Apparently before drying.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Surface soil	0.0	1.2	.....	.....
1	Sand, 50 per cent	.....	.....	200	100
1	Clay, 50 per cent	.....	.....	<1,000	.....
2	Blue clay, stained by iron oxide	1.2	7.1	<2,000	.....
3	Blue clay	8.3	3.4	<2,000	.....
	Sample No. 3 contained a white clay nodule 2 inches in diameter; differed from No. 2 in having no rusty streaks.				
4	Blue clay	11.7	10.0	.....	.....
4		21.73	0.7	<2,000	.....
	No. 4 consisted of two strata of blue clay, separated by a thin seam of No. 5.				
5	Red clay	21.7	0.03	<1,000	200
6	Quicksand	21.8	7.2	500	50
7	Blue clay, nearly black	29.0	2.6	<2,000	.....
	No. 7 did not appear rusty before drying.				
8	Blue quicksand	31.6	0.4	200	50
	No. 8 was filled with small seams of sand which appeared running in all directions.				
9	Blue clay	32.0	0.6	<3,000	.....
10	Quicksand	32.6	0.8	300	100
11	Blue clay, marked by iron oxide	33.4	0.2	2,000	200
12	Blue clay; nearly indigo when fresh	33.6	4.0	.....	.....
13	Blue clay	37.6	0.4	2,000	200
13	Gravel	.....	.....	10	$\frac{1}{4}''$
13	Sand	.....	.....	50	20
14	Gravel, 20 per cent	38.0	1.6	5	1″
14	Sand, 80 per cent	.....	.....	200	20
15	Gravel, 2 per cent	39.6	10.0	.....	.....
15		49.65	8.15	4	$\frac{3}{4}''$
15	Sand, 98 per cent	.....	.....	100	20
16	Sand	49.6	0.05	100	20
16	Lignite	.....	.....	>2,000	.....
17	Gravel, 40 per cent	66.8	3.6	.....	.....
17		57.8	8.9	4	$1\frac{1}{4}''$
17	Sand, 60 per cent	.....	.....	100	20
18	Blue clay, 50 per cent	66.7	0.1	2,000	200
18	Gravel, 50 per cent	.....	.....	$\frac{1}{4}''$	.....
	Thoroughly mixed.				
19	Fine sand and decayed wood	70.4	0.4	200	$\frac{1}{8}''$
20	Fine sand	70.8	2.4	200	20
21	Gravel, 50 per cent	73.2	8.1	$\frac{3}{8}''$	1″
21	Sand, 50 per cent	.....	.....	100	20
	In No. 21 a pudding-stone was struck, at a depth of 79.8 feet, in size 4 by $2\frac{1}{2}$ by 1 inch.				
22	Gravel	81.3	7.1	.....	$2\frac{1}{8}''$
23	Blue clay	88.4	0.02	2,000	200
23	Fine gravel	.....	.....	.....	.....
24	Gravel, 50 per cent	88.42	0.18	.....	1″
24	Sand, 50 per cent	.....	.....	50	20
25	Same as above, with fragments of buhr-stone	88.6	10.2	.....	.....
	In No. 25 (at a depth of 92.6 feet) a buhr-stone bowlder, several inches in thickness, was struck and fragments brought up.				
26	Heavy gravel, 50 per cent	98.8	5.4	$\frac{3}{8}''$	2″
26	Sand, 50 per cent	.....	.....	50	20
27	Gravel, 10 per cent	104.2	23.8	$\frac{1}{4}''$	2″
27	Sand, 90 per cent	.....	.....	50	20

Respectfully submitted.

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Boring No. 9.

Arrived, by steamer Osceola Belle, on Missouri shore at foot of Island No. 8, from Fort Pillow, Tenn., on Sunday, June 22, and left for Donaldson's Point on July 1 at 7 a. m The derrick was raised and the boring begun June 23, which was rainy—only 6 hours' work done. The pump became fouled at 98 feet and 110 feet. Tried to get it loose with windlass and tackle; this failing the pipe was pulled up 1½ feet, the pump held by tackle, then pipe was mauled until pump became loose; but each time in order to put maul on pipe, the wire rope had to be taken off the reel. The 3-inch pipe was twisted to 168 feet, then the 2-inch pipe was used. More 3-inch pipe would have been used had the supply not been exhausted. The 2-inch pipe was sunk to 212.5 feet; thence to 214 feet—where boring ends—boring was continued without sheathing. All the 2-inch pipe fit for use was in the ground; otherwise the boring could have been made deeper.

Layers of clay, exhibiting a variety of colors, separated by layers of yellow sand, occurred from 110.5 feet to 153.2 feet. Nothing similar has been found in any previous boring. The lignite found at 199.6 feet is probably a layer. These lignitic layers have been the only guide in marking the division between the tertiary and later sedimentary beds, heretofore. By a microscopic examination, however, some of the lower clay layers of this boring may be determined as tertiary.

No.	Apparently before drying.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Gray sand. Contains particles of lignite.	0.0	1.0	400	80
2	Light brown sand. Grows darker and finer with the descent.	1.0	3.0	500	100
3	Light brown clay, pasty. At 9.0 feet it contains streaks of blue clay and some reddish brown clay; thence the proportion of blue clay increases with the descent.	4.0	11.2	2,000	1,000
4	Blue sandy clay. This clay grows stiffer and finer in texture with the descent to 23.8 feet; thence to 30.3 feet coarser and more pasty; thence finer and stiff.	15.2	20.4	800	300
4 A.	A sample from 34.5 feet	34.5	.....	2,500	1,000
5	Bluish sand. The clay contains sandy streaks.	35.6	6.4	250	50
6	Blue clay. From 35.6 to 42.0 feet it is sand and stiff clay, probably occurring in alternate layers. Every pumpful contained several lumps of clay and sand mixed together, so that the location of clay layers could not be determined. Judging from the size of the lumps, the thickness of the clay layers varies from 1 to 4 inches. About 50 per cent. of sand and 50 per cent. of clay were brought up.	.....	.....	3,000	.....
7	Dark gray sand. Contains particles and a few lumps of lignite and particles of gravel.	42.0	3.0	80	>20
8	Gray sand, 40 per cent	45.0	17.0	100	20
8	Gravel, 60 per cent. From 45.0 to 55.0 feet it is 20 per cent. sand and 80 per cent. gravel; thence to 62.0 feet it is 50 per cent. sand and 50 per cent. gravel.	.....	.....	$\frac{5}{8}$″	2¾″
8 A.	Pebbles, some of them containing fossils, lumps of lignite conglomerates, and decayed wood, from 45.0 to 62.0 feet.	.....	.....	.....	.....
9	Dark sand, 95 per cent	62.0	2.3	80	20
9	Gravel, 5 per cent. Contains particles and lumps of lignite.	.....	.....	10	4
10	Blue clay	64.3	4.6	2,000	1,000
10 A.	Wood. The fibers of which are preserved.	67.5	0.4	.....	.....
11	Sand, 20 per cent	68.9	17.3	60	20
11	Gravel, 80 per cent. Largest pebble (3¼ by 1½ by 1 inches) is preserved. At 69.0 feet it is 25 per cent. sand and 75 per cent. gravel; thence the proportion and coarseness of the gravel increase. At 80.0 feet it is 15 per cent. sand and 85 per cent. gravel. Sample is from 69.0 feet. At 82.8 feet some cottonwood 6 inches thick was found. Fibers are preserved.	.....	.....	8	3¼″
11 A.	Pebbles occurring in No. 11, some of them containing fossils and cottonwood from 82.8 feet.				
12	Blue clay. The sample contains some sand from adjacent layers.	86.2	0.03	<3,000	.....

No.	Apparently before drying.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
13	Dark gray sand, 90 per cent	86.23	4.77	100	20
	Gravel, 10 per cent	.....	.....	15	4
	Contains particles of lignite.				
14	Gray sand, 30 per cent	91.0	15.0	70	20
	Gravel, 70 per cent	.....	.....	3	>2¾″
	Contains particles and rounded lumps of lignite. The coarseness of the gravel increases with the descent. A conglomerate was found at 104.0 feet; brought up in fragments. The largest pebble was brought up in fragments.				
14 A.	Pebbles and fragments of a conglomerate.				
15	Sand, 20 per cent	106.0	2.7	50	20
	Gravel, 80 per cent	.....	.....	8	1
	A sand conglomerate, containing iron, occurred in this layer (similar to the one preserved from 131.0 feet in No. 18); was brought up in fragments.				
16	Light gray sandy clay	108.7	0.3	1,500	500
17	Light gray sand, 60 per cent	109.0	1.5	100	20
	Gravel, 40 per cent	.....	.....	12	2″
	Several lumps of clay, similar to No. 16, were brought up with the sand and gravel of this layer. Largest pebble (2 by 1⅛ by ⅞ inches) is preserved.				
17 A.	Pebble and sand conglomerate containing iron	.....	.....	.....	.....
18	Clay	110.5	21.3	2,000	>20
	The color of the clay changes frequently. At 110.5 feet the clay is similar to No. 16 (no sample of this clay is preserved); at 111.4 feet it is light brown and reddish yellow clay; at 112.6 feet it changes to bluish clay; at 112.8 feet it is very sandy clay; thence bluish clay to 127.0 feet, where it is light brown pasty clay, containing particles of sand and gravel. From 127.5 to 131.0 feet it is bluish clay. At 131.0 feet the clay is sandy, contains a sand conglomerate containing iron, and is changing to yellowish clay. The several changes of color and texture are shown by the sample, which consists of clay from different depths.				
19	Yellowish sand	131.8	1.2	100	20
20	Reddish yellow clay	133.0	0.2	1,000	400
21	Reddish yellow sand	133.2	1.8	100	>20
22	Grayish clay	135.0	0.2	900	400
	Contains some yellowish clay.				
23	Yellow sand	135.2	15.8	80	20
24	Light gray clay	151.0	0.05	2,000	500
25	Light yellow sand, 95 per cent	151.05	0.75	90	20
	Gravel, 5 per cent	.....	.....	12	8
26	Purple clay	151.8	0.2	3,000	800
27	Light yellow sand, 95 per cent	152.0	1.0	90	20
	Gravel, 5 per cent	.....	.....	12	4
28	Purple clay	153.0	0.2	2,000	1,000
29	Light gray sand, 95 per cent	153.2	4.8	100	20
	Gravel, 5 per cent	.....	.....	12	8
30	Gray sand	158.0	7.0	80	>20
	Contains particles of gravel.				
31	Yellow sand	165.0	1.4	70	>20
	Contains a few particles of gravel.				
32	Light brown clay	166.4	1.0	700	200
33	Grayish sand, 80 per cent	167.4	3.8	80	20
	Gravel, 20 per cent	.....	.....	12	3
	The coarseness increases with the descent. At 167.5 feet it is 90 per cent. sand and 10 per cent. gravel; at 170.0 feet it is 70 per cent. sand and 30 per cent. gravel.				
34	Brown clay	171.2	10.8	1,000	200
	From 171.2 feet to 173.0 feet it is 50 per cent. clay and 50 per cent. sand, the sand occurring in streaks; thence the proportion of sand decreases with the descent, and the clay grows slightly darker.				
35	Gray sand	182.0	17.6	60	30
	From 190.0 feet to 199.6 feet several small sand conglomerates, containing iron, occur.				
36	Gray clay	199.6	0.4	<,000	.....
	Some lignite occurred at the top of this layer; quantity equal to a layer ⅛ inch thick.				
37	Black lignite	200.0	0.2	.....	.....
38	Dark gray clay	200.2	0.8	1,000	500
	Contains lignite. The quantity of lignite decreases and the clay grows coarser with the descent.				
39	Gray sand	201.0	7.0	125	50
	Grows slightly finer with the descent.				
40	Dark gray clay	208.0	0.5	1,200	800

No.	Notes and analysis.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
41	Dark gray sand ..... There is a great lack of uniformity in the size of the particles. It grows lighter in color and finer with the descent, gradually becoming pasty.	208. 5	.....	200	80
41 A.	A sample from 214 feet ..... Quit at 214 feet.	214. 0	.....	300	70

Respectfully submitted.

E H. WILSON, *Assistant, in charge.*

Maj. CHARLES R. SUTER, *Corps of Engineers, U. S. A.*

BORING No. 10.

Arrived at this boring from Plum Point Beach on Sunday, June 22, 1879, but, on account of rain, did not commence work until Tuesday, June 24, 1879, when the derrick was put into position, sinking commenced, and the boring finished the same day at 6 p. m., being the greatest amount of work accomplished by either party, so far, in one day.

As the party had large pipe in its possession, it was used in making this boring, as it will be in making all shallow borings in future, unless some accident should make other arrangements necessary.

No.	Notes and analysis.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Fine sand	0. 0	1. 2	300	120
2	Blue clay, with rusty streaks	1. 2	1. 3	<3, 000	.....
3	Clear blue clay ..... Soft and sandy, turning to a brownish color at 6.0 feet.	2. 5	7. 1	<3, 000	.....
4	Fine gray sand	9. 6	1. 6	100	50
5	Blue clay, soft	11. 2	5. 8	<3, 000	.....
6	Fine gray sand	16. 0	5. 3	120	75
7	Brown sandy clay	21. 3	1. 7	<3, 000	.....
8	Fine gray sand ..... Growing coarser; very muddy.	23. 0	4. 2	200	100
9	Brown sandy clay ..... Harder and finer at 28.5 feet, then turning blue and growing softer and more sandy.	27. 2	7. 5	<3, 000	.....
10	Fine blue sand ..... Growing gradually coarser and turning grayish in color. From 35.0 to 37.0 feet contains small bits of leaves and wood. Clear gray sand at 42.0 feet; from 48.0 feet grows gradually finer with a good sprinkling of lignite, giving it a dark appearance.	34. 7	16. 7	350	75
11	Blue clay ..... Quite fine; growing coarser and more sandy.	51. 4	1. 6	<3, 000	.....
12	Very fine gray sand	53. 0	12. 2	200	100
13	Fine blue clay	65. 2	1. 3	<3, 000	.....
14	Fine gray sand	66. 5	8. 9	100	75
15	Blue clay, with sandy streaks	75. 4	0. 2	<3, 000	.....
16	Fine gray sand ..... From 85.0 to 87.0 feet contains quite a lot of leaves. Sand more bluish, growing gradually finer.	75. 6	14. 4	120	75
17	Lignite washings; caked hard	90. 0	0. 75	.....	.....
18	Sand; gradually growing finer	90. 75	8. 75	75	40
19 {	Sand, 20 per cent	99. 5	1. 1	75	20
19 {	Gravel, 80 per cent ..... Stones very large: contains one clay stone.	.....	.....	3	3″
20	Blue clay ..... Pipe rested in blue clay at completion of boring.	100. 6	0. 2	<3, 000	.....

Respectfully submitted.

E. H. WILSON, *Assistant, in charge.*

Maj. CHARLES R. SUTER, *Corps of Engineers, U. S. A.*

Boring No. 12.

Arrived at this boring from No. 10, by skiff, on Wednesday, June 25, 1879, at 12 m., and were ready to leave on Thursday, June 26, 1879, at 6 p. m.

The pipe did not go down so rapidly or so easily in this boring as in some others, but no special difficulty was encountered.

The ground on which this boring is situated is of comparatively old formation, judging from the growth of timber.

No.	Apparently before drying.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Fine sand	0.0	2.2	300	120
2	Brown, sandy clay The hardest portion had red streaks; the softer and sandy portion was clear. Grows more sandy from 9.0 feet.	2.2	11.2	<3,000	.....
3	Blue clay Quite coarse. Grows more sandy and turns brownish as it descends.	13.4	4.9	3,000	.....
4	Fine brown sand	18.3	3.1	1,000	100
5	Blue clay from 21.4 feet to 21.42 feet Followed by—	21.4	0.02	<3,000	.....
	Blue sand from 21.42 feet to 24.0 feet	21.42	2.58	200	100
6	Sandy clay Greenish-brown, growing more sandy as it descends.	24.0	1.8	<3,000	.....
7	Dark-blue sand Quite muddy, with an offensive odor when fresh. Grows a little clearer from 32.0 feet.	25.8	9.5	100	50
8	Dark-green sandy clay Grows softer as it descends.	35.3	2.9	<3,000	.....
9	Fine gray sand Quite muddy. Contains a large amount of fine material.	38.2	4.6	120	75
10	Blue clay Quite hard at first, but growing softer as it descends.	42.8	2.7	<3,000	.....
11	Fine gray sand	45.5	1.5	120	75
12	Sandy, blue clay	47.0 49.5	2.5 4.5	<3,000	.....
13	Fine gray sand Growing coarser from 67.0 feet.	64.02	4.48	100	50
13 A.	Blue clay A very thin stratum, preceded and followed by fine gray sand.	64.0	0.02	<3,000	.....
14	Sand, 80 per cent	68.5	34.0	40	20
	Gravel, 20 per cent Gravel increasing to 65 per cent. at 74.0 feet; decreasing to 30 per cent. at 80.0 feet; increasing to 80 per cent. at 85.1 feet. Average, 6 to an inch. To 90 per cent. at 94.0 feet, and so to 102.5 feet.	.....	.....	4	<3″
14 A.	Pieces of black lignite and bark A large piece of pudding-stone was found at 100.7 feet. Boring completed in sand and gravel at 102.5.	74.5	.....	.....	.....

Respectfully submitted.

E. H. WILSON,
Assistant, in charge.

Maj. Chales R. Suter,
Corps of Engineers, U. S. A.

BORING NO. 13.

Were moved by wagon from opposite foot of Island No. 8 to Donaldson's Point, Mo., on July 1.

The derrick was raised and the boring begun on the 2d instant. When pump was at 30 feet the pump tongs became detached. The pump was rescued by boring the ship auger into the sand in the pump and then pulling up by means of the tackle. This caused a delay of 1¼ hours. No other unusual delay was caused at this boring. The pipe was twisted to 100 feet. The boring was finished at 8.30 a. m. on the 3d instant, at 100 feet.

No.	Apparently before drying.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Light-brown sand At 2.5 feet it is clayey sand.	0.0	9.5	300	100
2	Dark-brown sand Contains particles of lignite. At 12.3 feet the color is lighter. From 16.5 feet to 18.0 feet the sand contains about 5 per cent. of gravel, and is lighter in color.	9.5	8.5	100	50
3	Clayey sand	18.0	0.2	900	500
4	Brown sand At 18.2 feet it is fine brown sand; the sand grows coarser with the descent, and contains small rounded lumps and particles of lignite.	18.2	7.8	80	25
5	Brown sand, 90 per cent	26.0	7.5	70	20
	Gravel, 10 per cent	.....	.....	4	1⅜″
	The sample contains the largest pebble.				
6	Brown sand, 30 per cent	33.5	5.2	50	20
	Gravel, 70 per cent	.....	.....	10	1⅝″
	Largest pebble (1⅝ by ⅞ by ½ inch) is preserved.				
6 A.	Pebbles from No. 6.				
7	Light-brown sand Contains particles of lignite.	38.7	9.3	80	30
8	Gray sand, 90 per cent	48.0	3.5	100	20
	Gravel, 10 per cent	.....	.....	8	3″
	Contains a few large pebbles; largest (3 by 1⅛ by 1 inch) is preserved.				
8 A.	Pebbles from No. 8.				
9	Blue clay Contains sandy streaks.	51.5	0.8	2,500	1,000
10	Dark sand The upper part of this layer is very fine sand; the coarseness increases with the descent. At 60.0 feet particles of gravel occur.	52.3	9.7	86	>20
11	Dark-gray sand, 40 per cent	62.0	8.8	60	20
	Gravel, 60 per cent	.....	.....	10	2½″
	The sample is from 65 feet. The coarseness increases with the descent, At 62.0 feet it is 90 per cent. sand and 10 per cent. gravel. Largest pebble 2½ by 1⅝ by 1⅛ inches.				
11 A.	Pebbles from No. 11.				
12	Grayish clay Light-brown when dry.	70.8	0.1	<3,000	.....
13	Dark-gray sand Contains particles of lignite. A pebble (4 by 1¾ by ¾ inch) from 72.0 feet was brought up in fragments. At 77.0 feet some wood was found; here the sand was darker and finer, but on descending, soon changed to sand similar to that found above the wood. A few pebbles that occurred at 88.0 feet are preserved.	70.9	21.1	100	>20
13 A.	Pebbles from No. 13.				
14	Dark gray sand, 20 per cent	92.0	.....	33	20
	Gravel, 80 per cent	.....	.....	10	1½
	Largest gravel stone 1½ by 1¼ by ¾ inch. From 92.0 feet to 94.0 feet it is 30 per cent. sand and 70 per cent. gravel, the gravel averaging ½ inch in diameter; thence to 100.0 feet there is no change. The sample is from 94.0 feet. Quit at 100.0 feet.				
14 A.	Pebbles from No. 14.				

Respectfully submitted.

E. H. WILSON,
Assistant, in charge.

Maj. CHARLES R. SUTER,
Corps of Engineers, U. S. A.

BORING NO. 14.

Commenced to move from Boring 12 to Boring 14, on Friday, June 27, 1879, at 6 a. m., but owing to the bad condition of the roads due to recent heavy rains, the long distance to be traveled, and scarcity of teams, the whole outfit of the party only arrived on Saturday, June 28, 1879, at 12 m.

Boring was immediately commenced, and the work finished on Monday June 30, 1879, at 5 p. m.

The ground on which this boring is situated is quite an old formation, being a point on what was formerly Island No. 9, but now a portion of the main shore.

No.	Notes and analysis.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Fine sand	0.0	7.6	300	120
2	Brown sandy clay, with rusty streaks Hard at first, but growing softer and more sandy.	7.6	5.4	<3,000	
3	Fine brown sand Turns bluish from 15 feet.	13.0	4.4	500	100
4	Sandy blue clay Contains bits of wood. The clay grows finer as it descends.	17.4	4.4	<3,000	
5	Fine sand, gradually growing coarser	21.8	5.2	90	50
6	Fine blue clay; quite hard	27.0	0.6	<3,000	
7	Fine gray sand; growing rapidly coarser to 33.2 feet, where gravel appears.	27.6	5.6	80	50
8	Sand, 93 per cent	33.2	0.4	60	20
	Gravel, 7 per cent Gradation from No. 7.	.....	.....	3	1½″
9	Blue clay A very thin stratum, but undoubted.	33.6	0.03	<3,000	
10	Gray sand Growing finer at 47 feet, where it is bluish-gray and contains old leaves and bits of wood to 51 feet, from which is taken a sample called 10 A. At 55 feet a layer ¼ inch thick of white clay and claystones is met and sampled as 10 B. Followed by gray sand same as before.	33.63	30.97	75	30
10 A.	Sand, containing leaves and wood as indicated above	47.0	4.0	100	75
10 B.	White clay and claystones, as indicated in No. 10	55.0	0.025	<3,000	
11	Sand, 93 per cent	64.6	7.8	50	20
	Gravel, 7 per cent Gravel increases to 12 per cent. at 70 feet.	.....	.....	7	1½″
11 A.	Blue clay Occurring in No. 11, a very little, followed by sand and gravel as before. Doubt as to its existence as a stratum.	71.0	0.05	<3,000	
12	Blue clay	72.4	1.0	<3,000	
13	Fine gray sand Quite muddy; grows coarser and cleaner from 82 feet. Contains a large amount of fine material.	73.4	15.1	50	>20
14	Sand, 80 per cent	88.5	10.5	25	20
	Gravel, 20 per cent Gravel increasing rapidly to 60 per cent. at 91 feet and 80 80 per cent. at 93 feet. Decreasing to 35 per cent. at 99 feet.	.....	.....	5	3″
15	Blue clay; thought to be a stratum	99.0	0.025	<3,000	
16	Sand, 85 per cent	99.025	1.575	30	20
	Gravel, 15 per cent Continuing to the end of the boring at 100.6 feet.	.....	.....	8	1

Respectfully submitted.

E. H. WILSON,
Assistant in charge.

Maj. CHARLES R. SUTER,
Corps of Engineers, U. S. A.

Boring No. 15.

Arrived at this boring by skiff, with derrick and pipe, from camp at No. 14, on Thursday, July 3, 1879. The small pipe was used in making this boring, because the large pipe is crooked, and requires more men to turn it than the party could devote to it, and some time was consumed in bringing the small pipe by skiff from the site of No. 18, where it had been left when the party came on this reach, the intention being then to use it only for deep borings. The 4th of July being a national holiday, no work was done. During a terrible storm which blew up that evening, however, the high bank caved so badly as to swamp the party's skiff, and considerable delay was occasioned in trying to recover it on the morning of the 5th. The boring, nevertheless, was pushed to a depth of 37 feet, being retarded by frequent and extensive rises, and by the sickness, which seems to be becoming prevalent, of several of the men. Sunday, the 6th, no work was done, and the boring was completed on Monday, the 7th, at 6.30 p. m., at a depth of 101 feet, the pipe resting in clay, of the Tertiary lignitic formation.

No.	Notes and analysis.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Sandy blue clay	0.0	2.6	1,000	200
2	Fine brown sand	2.6	39.4	200	75
	Contains fine drift and muddy wash at 12 feet—drift consisting of bits of wood and leaves. At 22 feet there is about 50 per cent. mud, very dark colored. Sand grows cleaner and lighter colored from 25 feet. Gradually grows coarser from 30 to 34 feet, then finer and dirty from 37 to 42 feet.				
3	Sand, 80 per cent	42.0	7.8	100	20
	Gravel, 20 per cent	.....	.....	5	$\frac{3}{4}$″
	Gravel increasing in quantity and rapidly growing coarser from 45 feet to 90 per cent. at 49 feet. Average 3.				
4	Blue clay	49.8	0.02	<3,000	.....
5	Sand, 10 per cent	49.82	18.18	50	20
	Gravel, 90 per cent	.....	.....	10	4
	Gravel decreasing in quantity and stones growing larger. At 55 feet 60 per cent.; average 6, with a lot of lignite wash. There is a yellow wash from the material at 64 feet, where gravel decreases and yellow wash increases. At 66 feet, 30 per cent. gravel; at 67.8 feet, 80 per cent. stones, nearly all large.				
5 A.	Black lignite wash	62.0	0.4	.....	.....
	Occurring in sand and gravel.				
5 B.	Fragments of puddingstone	64.0	.....	.....	.....
	And also of a peculiar red stone, metallic lustre inside, giving a blood-red wash and apparently red oxide of iron.				
6	Dark-brown clay	68.0	24.0	<3,000	.....
	Overlying tertiary lignite. Very fine and hard. Wash is light brown when fresh, but turns very dark, rapidly, when exposed to light and air. At about 75 feet a copious flow of water was noticed. Clay becomes a little more sandy from 90 feet, with thin layers of fine white sand, about as thick as paper.				
7	Brown lignite	92.0	0.7	.....	.....
	Very hard.				
8	Lignite mixed with clay	92.7	0.8	.....	.....
	About 50 per cent. each.				
9	Clear brown lignite	93.5	2.0	.....	.....
10	Clay and lignite	95.5	5.5	.....	.....
	Clay commences to appear in lignite at 98 feet and graduates to pale-green clay at 101 feet, where boring ceased. Graduation may clearly be seen by examining samples from different depths, as preserved.				

Respectfully submitted.

E. H. WILSON,
Assistant, in charge.

Maj. CHARLES R. SUTER,
Corps of Engineers, U. S. A.

BORING No. 16.

Arrived at this boring from No. 14 by team on Tuesday, July 1, 1879, at 2 p. m., and left by skift with the derrick for the next boring on Thursday, July 3, 1879, at 8 a. m.

The bank here is some 30 feet above water-level, said to have been caused by an uplifting of all this portion of country by the earthquake of 1811. In its perpendicular face may be seen a stratum of blue clay passed through with the pipe from 20.2 to 44 feet, and which does not extend 20 feet above or below the point of boring.

Work was a little retarded by sickness among the men, which is beginning to be quite prevalent. The ground, although very much above high-water mark, consists altogether of river deposit, or what is commonly called "made ground."

No.	Notes and analysis.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Fine sand Contains a large amount of fine material.	0.0	7.0	200	100
2	Sandy brown clay Some portions very dark brown, containing white lumps; becomes clear at 80 feet; begins at 15 feet to have red and blue streaks.	7.0	13.2	1,000	200
3	Sandy blue clay In streaks, alternating with sand; contains wood and bark, which disappear at 27 feet; clay grows harder and finer, and sandy streaks disappear.	20.2	6.8	<3,000	.....
4	Clear blue clay Growing harder; very fine at 40 feet, but growing softer from 41 feet,	27.0	17.0	<3,000	.....
5	Sand Containing lignite washings. A well-preserved butternut came from this depth and is preserved. This sand contains a large amount of fine material.	44.0	0.6	100	35
6	Blue clay In very thin layers, alternating with still thinner layers of sand; contains a nodule of very hard yellowish clay.	44.6	1.2	<3,000	.....
7	Sand, 90 per cent	45.8	33.8	75	20
	Gravel, 10 per cent	.....	.....	6	2″
	Sand is quite dirty; gravel increases to 35 per cent. at 55 feet, with a quantity of lignite washings, which disappear at 60 feet, while the gravel rapidly diminishes in quantity. Sand contains a large amount of fine material.				
8	Fine gray sand	79.6	4.4	100	25
9	Sand, 80 per cent	84.0	9.6	100	20
	Gravel, 20 per cent	.....	.....	6	1
	There is not a gradation from the previous sample, but an abrupt appearance of gravel at this point.				
9 A.	Walnut bark found in sample 9 at Gravel increasing in quantity.	86.0	.....	.....	.....
9 B.	Bark again found in No. 9 Gravel diminished to 5 per cent. at this depth. Average 3 to 1 inch. Sand became clean.	92.0	.....	.....	.....
10	Coarse sand, 85 per cent	93.6	7.4	50	20
	Fine gravel, 15 per cent	.....	.....	12	>3″
	Gradation from No. 9; contains lignite wash; gravel increases rapidly in quantity and size to 75 per cent. at 96 feet, and remains so to end of boring at 101 feet.				

Respectfully submitted.

E. H. WILSON,
Assistant, in charge.

Maj. CHARLES R. SUTER,
Corps of Engineers, U. S. A.

BORING No. 17.

Were moved by wagon from Donaldson's Point to location of boring, three-quarters of a mile below landing at Bryan's Point, Missouri, on July 3, and were ready to leave on the 7th instant at 11 a. m.

The derrick was raised on the 3d, and the boring begun on the 5th. The boring was made to a depth of 100.5 feet. No mechanical difficulties were encountered.

After the boring was commenced, two of the party were taken sick, and as we could not get other men, the force was small and work slow.

No.	Apparently before drying.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Light-brown sandy clay Grows finer and darker on descending.	0.0	1.4	1,200	400
2	Brown clay Crumbles readily. Grows coarser and lighter in color to 2.8 feet; thence to 3 feet darker and finer; thence to 4.8 feet light in color and coarser.	1.4	3.4	<3,000	.....
3	Light-brown sandy clay	4.8	4.2	800	300
4	Light-brown clay	9.0	1.8	3,000	800
5	Light-brown sand Contains particles of lignite.	10.8	9.2	200	70
6	Bluish-brown clay and reddish-brown clay	20.0	4.2	800	500
7	Light-brown sand Contains particles of lignite.	24.2	2.8	200	80
8	Blue clay	27.0	0.3	1,200	800
9	Light-brown quicksand Contains particles of lignite. From 40 to 50 feet the coarseness increases slightly. A few small pebbles occurred at 47 feet—largest 1 inch.	27.3	22.7	150	>20
10	Dark-gray sand, 70 per cent	50.0	15.0	80	20
	Gravel, 30 per cent	.....	.....	12	1″
	The sample is from 50 feet, where it is 90 per cent. sand and 10 per cent. gravel. The proportion and coarseness of the gravel increases with the descent. A few small, rounded lumps of lignite occurred at 56 feet.				
11	Dark-gray sand, 50 per cent	65.0	17.0	40	20
	Gravel, 50 per cent	.....	.....	8	1⅝″
	Most of the large gravel of this layer occurred from 72 to 80 feet. Largest pebble, 1⅝ inches by 1 inch by ⅞ inch.				
11 A.	Pebbles from No. 11.				
12	Gray sand, 20 per cent	82.0	18.5	50	20
	Gravel, 80 per cent	.....	.....	6	2½″
	At 82 feet it is 30 per cent. sand and 70 per cent. gravel; at 92 feet it is 10 per cent. sand and 90 per cent. gravel. From 82 to 94 feet the coarseness increases; thence to 100.5 feet the coarseness decreases.				
12 A.	A sample from 92 feet.				
12 B.	Pebbles and lignite from No. 12. Largest pebble 2½ by 1½ by 1⅛ inches.				
13	Sand, 50 per cent	100.5	.....	40	20
	Gravel 50 per cent	.....	.....	10	1½″
	This sample is from 100.5 feet, where the boring was declared finished.				

Respectfully submitted.

E. H. WILSON,
Assistant, in charge.

Maj. CHARLES R. SUTER,
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Boring No. 18.

Arrived at boring 18 by team, with the camp and extra pipe, on Tuesday, July 8, 1879, from No. 16, at 12 m.; the derrick and small pipe arriving at same time by skiff, from No. 15.

Camp was pitched and the derrick put up. On Wednesday a depth of 93 feet was attained, and on Thursday (10th) 125 feet, without trouble, except some delay in extracting pumps, which evinced a propensity for becoming entangled whenever they were worked near the mouth of the shoe.

On Friday the pipe began to turn hard, on account of some crooked lengths which were put on through necessity; and material commenced to rise considerably, so that night found the pipe only at 153.5 feet. On Saturday clay was struck at 159.3 feet, and the large pipe resting on it, the small pipe was put down. This, which is very crooked, worked rapidly for a time, when there was not much friction, so that 173 feet was reached that night, and 205 feet on Monday (14th).

Being then deep in sand, it commenced to turn slowly, and the sand seemed to bind it to such an extent that fears of twisting off a length were entertained. For every foot gained there was a corresponding rise of from 15 to 40 feet, and as, on account of crooked pipe, the long pumps could not be used, it required considerable time to pump out a rise with short ones. Finally, when half a day's hard work (driving having been resorted to), on Tuesday (15th) secured only an additional 3 feet, it was determined to prosecute the boring no further, and the remainder of the day was spent in drawing the small pipe. On Wednesday July 16, 1879, the large pipe was drawn, the derrick dismounted, camp struck, and at 12 m. the party left by wagon for boring 20, at Marr's Landing.

The lignite fo und at 157.5 feet, although scanty, is undoubtedly a stratum in the position of its original formation, and would indicate that the underlying strata of hard clay and white sand were of Eocene Tertiary formation.

No.	Notes and analysis.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Surface soil Sandy clay, growing hard to 7 feet, then softer and more sandy.	0.0	9.2	1,000	100
2	Fine brown sand Contains a large amount of very fine material.	9.2	10.8	200	75
3	Sandy blue clay, with red streaks, and contains streaks of softer material.	20.0	4.3	<3,000	.....
4	Fine sand In thin layers of red and gray; turns to clear brown at 30 feet.	24.3	12.1	250	100
5	Dark-blue clay, with rusty, sandy streaks	36.4	0.2	<3,000	.....
6	Brown sand Coarser than No. 4, and growing still coarser till a few gravel stones appear, at 40.8 feet. Contains a large amount of fine material.	36.6	9.9	100	30
7	Sand, 85 per cent	46.5	19.7	75	20
	Gravel, 15 per cent	.....	.....	6	1½″
	Gravel decreases to 5 per cent. at 50 feet, and thus to 65 feet, where the sand becomes bluish and the gravel increases to 20 per cent. at 66 feet.				
8	Blue quicksand	66.2	1.8	100	50
9	Sand, 50 per cent	68.0	14.5	100	20
	Gravel, 50 per cent	.....	.....	6	>3″
	Gravel increasing from 73 feet to 80 per cent. at 78 feet; decreasing rapidly from 81 feet to No. 10.				
10	Coarse gray sand, gradually growing coarser	82.5	3.0	100	>20
11	Sand, 50 per cent	85.5	5.3	50	20
	Gravel, 50 per cent	.....	.....	4	>3
	Gravel rapidly increasing to 75 per cent. at 86 feet, where a light-colored wash appears.				
11 A.	Blue clay A small lump hardly thought to be a stratum, lying in sand and gravel.	90.0	0.0	<3,000	.....
12	Black lignite. The result of wash	90.8	0.3	.....	.....
13	Sand, 40 per cent	91.1	22.4	50	20
	Gravel, 60 per cent	.....	.....	3	>3″
	Gravel increasing to 75 per cent. at 92 feet; then decreasing rapidly from 95 feet to 15 per cent. at 100 feet; then increasing as rapidly again to 50 per cent. at 102 feet, and 90 per cent. at 103 feet, where a sample called 13 B. is taken.				

No.	Notes and analysis.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
13 A.	Blue clay	93.2	.....	<3,000	.....
	A few small lumps found between 93.2 feet and 106 feet at various points in sand and gravel. They may be strata, but more probably existed as nodules.				
13 B.	Sand, 10 per cent	103.0	.....	50	20
	Gravel, 90 per cent	.....	.....	3	>3
	Gradation from No. 13. From 112 feet gravel rapidly decreases to 0 per cent. at 113.5 feet.				
14	Coarse gray sand	113.5	4.9	75	50
	Growing finer and turning brownish; from 115 feet grows again coarser to 118 feet.				
15	Sand, 50 per cent	118.4	17.3	30	20
	Gravel, 50 per cent	.....	.....	8	>3
	Gravel increasing in quantity and size. At 120 feet, 90 per cent. gravel, average 4; decreasing from 127.5 feet to 25 per cent. at 130 feet; increasing to 75 per cent. at 134 feet.				
16	Fine light gray sand	135.7	1.9	90	50
17	Clay, in blue and brown streaks	137.6	0.2	<3,000	.....
18	Sand. Very fine light-gray	137.8	16.2	150	75
	Growing coarser from 142 feet to 145 feet, with occasionally some thin layers of clay from $\frac{1}{8}$ to $\frac{1}{2}$ inch thick; very white under the glass.				
18 A.	Some peculiar stones found at 145 feet and 151.8 feet.				
19	Light-brown clay	154.0	2.2	<3,000	.....
	Very hard and fine; contained lumps of lignite, isolated in the clay.				
20	Fine light-gray sand	156.2	0.4	150	75
	Contains a large amount of fine material.				
20 A.	Stones, resembling iron pyrites, found in No. 20.				
21	Light-brown clay, very hard	156.6	0.9	<3,000	.....
22	Brown lignite, a layer; local	157.5	0.4	.....	.....
23	Sand, with thin layers of sandy clay	157.9	1.1	100	30
24	Hard brown clay	159.0	2.4	<3,000	.....
25	Fine white sand	161.4	2.9	100	50
26	Light-brown clay, very hard	164.3	2.4	<3,000	.....
27	Fine white sand; grows coarser as it descends	166.7	41.3	100	30
27 A.	Sand	173.8	2.2	100	30
	Same as above, but containing lignite washings sufficient to give a dark color from 173.8 to 176 feet, where they disappear, and sand same as No. 27 continues to end of boring at 208 feet.				

Respectfully submitted.

E. H. WILSON,
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BORING NO. 19.

Were moved by wagon from Bryan's Point to Kopp's Landing, Missouri, 3 miles above New Madrid, on July 7 and 8. Some delay was caused in moving on account of a bad road, and the necessity of taking four very sick men to New Madrid.

The derrick was raised, and the boring begun on the afternoon of the 8th. The pipe twisted harder in this boring than in any other one previously made by this party. After reaching 75 feet, eight men were required to twist the pipe. Considerable delay was caused by sickness in the party. It became necessary to stop the work twice and send to New Madrid for men. No mechanical difficulties were encountered. The boring was finished at 4.30 p. m., on the 10th instant, at 100.2 feet.

No.	Apparently before drying.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Light-brown sand	0.0	2.0	500	200
	From 1.3 foot to 2 feet it is finer and darker. Contains small roots.				
2	Light-brown clay	2.0	0.6	2,000	1,000
	Contains some small roots.				
3	Brown clay	2.6	2.4	2,000	100
	Grows darker to 3 feet. From 4.2 feet to 5 feet it contains some reddish-brown clay. The sample is from 3 feet.				
4	Brown clay	5.0	4.3	3,000	1,000
	Contains reddish-brown clay, which increases in proportion with the descent. The sample is from 5.5 feet.				
5	Grayish, bluish, and reddish-brown clay	9.3	6.7	1,500	300
	Grows coarser with the descent.				
6	Blue sandy clay	16.0	6.4	600	300
	From 16 feet to 16.05 feet this layer is blue, containing brownish-red clay (<3,000 diameters to an inch); thence it is sandy blue clay, growing softer on descending.				
7	Light-brown sand, 95 per cent	22.4	1.6	50	20
	Gravel, 5 per cent	.....	.....	2	1⅝″
	The sample contains the largest pebble, 1⅝ by ⅞ by ½ inch.				
8	Blue clay	24.0	2.6	3,000	200
	Grows coarser, and contains sandy streaks, on descending.				
9	Dark sand	26.6	6.5	300	30
	Contains particles of lignite.				
10	Light-blue clay	33.1	0.6	<3,000	
11	Dark sand	33.7	11.3	80	>20
	Contains particles of lignite and gravel. Grows slightly coarser with the descent.				
12	Dark-gray sand, 95 per cent	45.0	8.3	60	20
	Gravel, 5 per cent	.....	.....	15	4
13	Dark-gray sand, 70 per cent	53.3	1.7	70	20
	Gravel, 30 per cent	.....	.....	6	1¼″
	The sample contains the largest pebble, 1¼ by ⅞ by ⅝ inch.				
14	Dark-gray sand, 90 per cent	55.0	9.5	60	20
	Gravel, 10 per cent	.....	.....	12	2″
	Contains particles of lignite. At 55 feet it is 95 per cent. sand and 5 per cent. gravel. The proportion and coarseness of the gravel increases with the descent. At 62 feet it is 85 per cent. sand and 15 per cent. gravel. Most of the coarse gravel occurred at 61 feet.				
14 A.	Pebbles from 61 feet to 64.5 feet	61.0	.....	.....	.....
15	Dark-gray sand, 80 per cent	64.5	3.8	80	20
	Gravel, 20 per cent	.....	.....	15	8
	Contains particles of lignite.				
16	Gray sand, 40 per cent	68.3	5.7	60	20
	Gravel, 60 per cent	.....	.....	7	2″
	Contains particles and lumps of lignite.				
17	Dark-gray sand, 80 per cent	74.0	4.0	80	20
	Gravel, 20 per cent	.....	.....	12	2″
	Contains particles of lignite.				
18	Dark-gray sand, 20 per cent	78.0	4.5	90	20
	Gravel, 80 per cent	.....	.....	3	>3″
	Contains particles of lignite. The largest pebble (>3 by 2¼ by 2¼ inches) was brought up in fragments.				
18 A.	Pebbles from No. 18.				
19	Light-brown sand, 30 per cent	82.5	7.7	70	20
	Gravel, 70 per cent	.....	.....	2	>3′
	The upper part of this layer contains the coarsest gravel. At 82.6 feet a sandstone occurred, brought up in several fragments.				

No.	Apparently before drying.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
19 A.	Pebbles (and fragments of sandstone from 82.5 feet) from No. 19.				
20	Light-brown sand ..... Contains particles of lignite and gravel. The coarseness increases with the descent.	90.2	6.8	150	>20
21	Brownish-gray sand, 50 per cent	97.0	.....	80	20
	Gravel, 50 per cent ..... The coarseness increases on descending. The sample is from 100.2 feet, where the boring ended.	.....	.....	15	1

Respectfully submitted.

E. H. WILSON,
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BORING No. 21.

Moved camp from Kopp's Landing, above Morrison's, by skiff, to south side of Saint John's Bayou, above New Madrid, thence to lower part of New Madrid by wagon on July 16. Would have moved by wagon all the way but the ferry across the bayou was unsafe. On same day, after moving boring equipment from sand-bar opposite New Madrid to New Madrid by skiff, derrick was raised and boring begun. The 3-inch pipe was sunk by twisting to 140 feet; thence to 152 feet, boring was continued without sheathing. The 2-inch pipe was now lowered, and touched sand at 148 feet. It descended by twisting to 154 feet; thence to 207 feet, where boring ended, by mauling. The 2-inch pipe mauled very hard in this boring. Considerable delay was caused frequently by pump getting foul and repairing wire rope. In comparison with previous deep borings, very little coarse gravel was found. The boring was finished at 11 a. m. on the 23d instant, at 207 feet. The last specimen of sand is of a light-gray color, exactly similar to that found in undoubted Tertiary beds. It differs, however, here, as in deep borings Nos. 9 and 18, from similar beds found on the Plum Point reach, in being less compacted, rising in pipe. No lignite was found in this boring. The depth attained was as great as possible. A marked peculiarity of the boring was the strong flow of water from last gravel bed, between 192.7 feet and 203.7 feet. Three specimens of water, from 182 feet, 188 feet, and 196 feet, are preserved among the samples.

No.	Apparently before drying.	Location of layers.		Diameter to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Brown sand ..... Great inequality in size of particles; grows coarser and changes to reddish-brown sand on descending.	0.0	3.0	300	50
2	Reddish-brown sand	3.0	6.0	125	50
3	Light-brown sand ..... Contains particles of lignite.	9.0	11.5	150	20
4	Brown sand ..... Particles of gravel occur in this layer.	20.5	4.5	90	>20
5	Light-brown sand ..... Particles of lignite and gravel occur.	25.0	4.7	80	>20
6	Light-brown sand, 90 per cent	29.7	16.4	70	20
	Gravel, 10 per cent ..... The coarseness of the gravel decreases with the descent. Largest pebble, 2½ by 1½ by 1⅛ inches—from 38 feet is preserved.	.....	.....	8	2½″
7	Dark-gray sand, 75 per cent	46.1	15.2	50	20
	Gravel, 25 per cent ..... A few very hard lumps, or nodules of clay, that occurred at 61 feet, are preserved among the pebbles; largest pebble 3 by 1¼ by 1 inch.	.....	.....	5	3″
7 A.	Pebbles and nodules of clay from No. 7.				
8	Dark-gray sand, 90 per cent	61.3	7.4	60	20
	Gravel, 10 per cent	.....	.....	12	4

No.	Apparently before drying.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatness.
		Feet.	*Feet.*		
9	Dark-gray sand, 40 per cent	68.7	10.3	50	20
	Gravel, 60 per cent	.....	.....	8	⅞″
10	Brownish-gray sand, 70 per cent	79.0	9.3	70	20
	Gravel, 30 per cent	.....	.....	8	2
	The coarseness and proportion of the gravel increases with the descent. The sample is from 79 feet.				
11	Dark-gray sand, 30 per cent	88.3	5.7	40	20
	Gravel, 70 per cent	.....	.....	6	2¾″
	The coarseness and proportion of the gravel increases with the descent; at 92.5 it is 95 per cent. gravel. Largest pebble 2¾ by 2 by 1 inch; the sample is from 88.3 feet.				
11 A.	Pebbles from No. 11.				
12	Light-brown sand, 95 per cent	94.0	20.7	90	20
	Gravel, 5 per cent	.....	.....	10	>3″
	From 114 to 114.7 feet it is 50 per cent. gravel, averaging ½ inch diameter. Largest pebble (>3 inches—fractured by pump) was found at the bottom of this layer.				
12 A.	Pebbles occurring from 114 to 114.7 feet.				
13	Clay	114.7	15.3	1,000	100
	From 114.7 to 115 feet it is light green clay containing yellowish streaks; thence to 122 feet it is light blue clay, and quite gritty; thence the coarseness increases and the color is darker—changing to sand, containing fine material on descending.				
14	Gray sand	130.0	6.2	100	50
	Contains some very fine material.				
15	Light-gray sand	136.2	1.8	100	20
	Grows coarser on descending.				
16	Gray sand 90 per cent	138.0	2.4	70	20
	Gravel 10 per cent	.....	.....	8	2
17	Blue clay	140.4	11.1	<3,000	.....
	From 146 feet it grows coarser and softer on descending.				
18	Dark gray sand	151.5	1.5	80	>20
	Contains some very fine material. Particles of gravel occur.				
19	Dark sand, 30 per cent	153.0	15.5	80	20
	Gravel, 70 per cent	.....	.....	4	>2″
	Contains very fine material. Largest pebble was fractured by pump.				
19 A.	Pebbles and fragments of pebbles from No. 19.				
20	Dark sand	168.5	14.5	100	>20
	A lump of clay occurred at 174 feet—cannot tell whether or no it is a layer; it was found in a rise of sand. At 176 feet three argillaceous pebbles occurred; From 180 to 183 feet the sand is coarser and slightly darker. A few pebbles occurring at the bottom of this layer are preserved.				
20 A.	Lump of clay and pebbles from No. 20.				
21	Bluish clay	83.0	0.05	2,000	1,000
	This clay probably belongs to a layer, as the sand did not rise until clay was reached. Part of the sample was found in the rise that occurred.				
22	Dark-gray sand	183.05	5.55	100	>20
	A few pebbles occurred from 187.6 to 188.6 feet.				
22 A.	Pebbles from 187.6 to 188.6 feet	.....	.....	2	>1½″
23	Bluish clay	188.6	0.1	<3,000	.....
24	Light-brown sand	188.7	4.0	70	40
	Contains some lignite-wash. A few pebbles occur from 191 to 192.7 feet; largest pebble 1½ by ⅞ by½ inch.				
24 A.	Pebbles from 191 to 192.7 feet	.....	.....	¾″	½″
25	Light-brown sand, 25 per cent	192.7	11.0	60	20
	Gravel, 75 per cent	.....	.....	5	2
	Largest pebble 2 by 1½ by 1 inch. The sample is from 192.7 feet. The proportion of gravel increases from 50 per cent. at 192.7 feet to 90 per cent. at 203.7 feet.				
25 A.	Pebbles from No. 25.				
26	Gray sand	203.7	.....	70	30
	Grows slightly coarser and lighter in color on descending; contains particles of lignite-wash.				
26 A.	A sample from 207 feet, where boring ended	207.0	.....	60	>20

Respectfully submitted.

E. H. WILSON,
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BORING NO. 22.

Moved the boring equipment, by skiff, from Morrison's Landing, Missouri, to sand-bar in Kentucky, opposite Morrison's Landing, on July 11, and finished the boring at 6 p. m. on the 12th, at 100.7 feet.

From 94 feet to 96.7 feet is wood and a few large pebbles; thence to 100.7 feet is sand. Ninety-two feet was reached at 12 m. on the 12th. It took all the afternoon of the 12th to finish the boring. With the exception of the wood referred to, no unusual difficulties were overcome in this boring.

No.	Apparently before drying.	Location of layers.		Diameter to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Light-brown sand, 20 per cent	0.0	9.0	80	20
	Gravel, 80 per cent			1	>3¼″
	The largest pebble (>3¼ by 2½ by 2¼ inches) was fractured by the pump. From 3.5 feet to 9 feet the coarseness of the gravel decreases.				
1 A.	Pebbles from No. 1.				
2	Light-brown sand, 50 per cent	9.0	5.8	80	20
	Gravel, 50 per cent			10	¾″
3	Reddish-brown clay and blue clay	14.8	0.2	2,500	200
	Both change to sandy clay, and each occurs as a layer. The reddish-brown clay layer is about ⅛ inch thick. Cannot tell the order in which these two layers occur, as the quantity brought up was small, and came from pump in a lump.				
4	Light-brown sand, 65 per cent	15.0	10.0	80	20
	Gravel, 35 per cent			12	9/16″
5	Light-brown sand	25.0	3.5	70	>20
	Contains particles of gravel and lignite; grows darker with the descent.				
6	Dark sand, 95 per cent	28.5	9.6	60	20
	Gravel, 5 per cent			15	3
	Grows coarser with the descent; contains particles of lignite.				
7	Dark sand, 50 per cent	38.1	6.9	80	20
	Gravel, 50 per cent			5	1¼″
	The sample contains the largest pebble—1¼ by ½ by ⅜ inch. From 40 feet to 45 feet the proportion of gravel decreases.				
8	Dark sand, 85 per cent	45.0	14.0	60	20
	Gravel, 15 per cent			10	1
	The coarseness increases with the descent. The sample contains the largest pebble.				
9	Dark sand, 50 per cent	59.0	5.7	60	20
	Gravel, 50 per cent			8	¾″
10	Dark sand, 95 per cent	64.7	14.9	90	20
	Gravel, 5 per cent			8	4
	From 73 feet to 79.6 feet the coarseness increases with the descent.				
11	Dark sand, 10 per cent	79.6	11.4	40	20
	Gravel, 90 per cent			6	1¾″
	Contains particles and rounded lumps of lignite. The coarseness of the gravel increases with the descent.				
11 A.	Rounded lumps of lignite and pebbles from 88 feet	88.0			
	Largest pebble, 1¾ by 1⅛ by ⅞ inch.				
12	Sand, 5 per cent	91.0	5.7	50	20
	Gravel, 95 per cent			2	3¾″
12 A.	Wood (apparently sycamore)	94.0	2.7		
	A few large pebbles occurred while pumping through this wood, which was almost continuous from 94 feet to 96.7 feet. A fragment of a conglomerate from 96.6 is preserved.				
13	Light-brown sand	96.7		50	>20
	Contains particles of gravel. The samples are from 100.7 feet, where the boring ended.				

Respectfully submitted.

E. H. WILSON,
Assistant, in charge.

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BORING No. 24.

Moved the boring equipment, by skiff, from boring No. 22 to a point on sand-bar opposite landing at New Madrid, Mo., on July 14, and finished the boring at 3 p. m. on the 15th, at 100.5 feet. This boring was easily made. No accidents happened.

No.	Apparently before drying.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Light-brown sand, 90 per cent	0.0	24.5	60	20
	Gravel, 10 per cent	.....	.....	12	$\frac{5}{8}$′
	Grows darker with the descent. From 8 feet to 24.5 feet the proportion of the gravel decreases with the descent.				
2	Light-brown sand, 80 per cent	24.5	3.5	60	20
	Gravel, 20 per cent	.....	.....	12	$\frac{7}{8}$″
3	Light-brown sand, 25 per cent	28.0	18.1	40	20
	Gravel, 75 per cent	.....	.....	4	$3\frac{1}{8}$″
	Largest pebble, $3\frac{1}{8}$ by $1\frac{5}{8}$ by $\frac{1}{2}$ inch, preserved. From 28 feet to 37.4 feet it is 20 per cent. sand and 80 per cent. gravel; thence it is 30 per cent. sand and 70 per cent. gravel, but the gravel decreases in coarseness. Contains particles and lumps of lignite.				
3 A	Pebbles from No. 3.				
4	Light-brown sand. 40 per cent	46.1	15.4	50	20
	Gravel, 60 per cent	.....	.....	5	$1\frac{3}{4}$″
	At 46.1 feet it is 50 per cent. sand and 50 per cent. gravel. The proportion of gravel increases to 56 feet, where it is 70 per cent. gravel; thence the proportion of gravel decreases. At 55 feet lumps of lignite (wash) occur. Largest pebble, $1\frac{3}{4}$ by $1\frac{1}{4}$ by $\frac{1}{2}$ inch.				
4 A	Pebbles from No. 4.				
5	Light-brown sand, 75 per cent	61.5	16.5	50	23
	Gravel, 25 per cent	.....	.....	12	0
	From 65 feet to 78 feet the coarseness increases.				
6	Light-brown sand, 20 per cent	78.0	12.2	40	20
	Gravel, 80 per cent	.....	.....	6	$\frac{3}{4}$′
	At 80.7 feet a few small lumps of blue clay occurred. At 85 feet a few whitish irregular-shaped objects occurred. They effervesced when nitric acid was applied. They are preserved among the pebbles. The largest pebble (>$2\frac{7}{8}$ by $2\frac{3}{4}$ by $1\frac{7}{8}$ inches) is from 90 feet.				
6 A	Pebbles from No. 6.				
7	Blue clay	90.2	1.3	<3,000	.....
8	Bluish sand	91.5	9.0	100	40
	Grows coarser and lighter in color with the descent.				
8 A	A sample from 100.5 feet	100.5	.....	60	20
	The boring ended at 100.5 feet.				

Respectfully submitted.

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VICINITY OF PLUM POINT.

BORING No. 1.

Reached Ashport, Tenn., from Tiptonville, at 3 a. m., Saturday, March 29, and were ready to depart at 3 p. m., Saturday, April 5. The large pipe in this boring was sunk to the greatest depth practicable with our length of pipe—90 feet. After securing pipe at that depth with clutch, we endeavored to lower level of material in pipe, which had risen to 84 feet. Ceased our efforts after three hours' labor, with material 9 feet higher (at 75 feet), and introduced 2-inch pipe.

The larger pipe had been lowered without the aid of the maul, by twisting it at the moment that, by withdrawal of the pump, the material in pipe was induced to rise, and, in some cases (as in sinking through clay), where the material did not rise, by sinking below bottom of the pipe and permitting pipe to drop into the excava ion so made. In order to use the steel rope and stirrup, the party (No. 2) was obliged to use the sand-pump attachment for the first time in its experience. At depth of 35 feet the sand pump was lost, it having become detached from sand-pump tongs The pump

was secured, after repeated efforts, by driving the gravel auger (tool No. 22), after barbing its spiral edge, through 3 feet of overlying material, into pump and pulling steadily. Very great difficulty was experienced in extracting pipe. The 3-inch pipe had to be drawn over the smaller pipe, and it was discovered that the ninth length of 3-inch pipe was at the bottom.

After pulling up 2-inch pipe it became evident that the larger pipe, 10 feet from shoe, holding frictionally, had been turned off in our endeavors to sink small pipe by turning, the lower lengths of both pipes being bound firmly together by the interposing sand. Seventeen hours were occupied in pulling the pipe. The shoe of 3-inch pipe was at 108.12 feet above the shoe of the smaller pipe.

No.	Apparently before drying.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Sandy loam	0.0	0.3	200	100
2	Sandy yellow clay	0.3	8.1	700	250
3	Sandy yellow clay; finer; pasty on bringing to the surface.	8.4	1.4	1,000	500
4	Bluish clay	9.8	10.2	2,000	500
	From 8.4 feet to 9.8 feet coarse bluish sand; from 9.8 to 11.8 feet, blue clay; 11.8 feet to 14.5 feet, gradually coarser in texture; from 14.5 feet to 15 feet, tenacious clay; pasty to 16 feet; 16 feet to 16.4 feet, stiff; 16.4 feet to 19.8 feet pasty. All these were pronounced clay. 19.8 feet to 20 feet stiff clay. All specimens mentioned as stiff or tenacious, less than 3,000 diameters to an inch.				
5	Mud, 50 per cent	20.0	1.3	1,000	500
	Coarse sand, 50 per cent	.....	.....	50	20
	The usual fine sand succeeding clay, corresponding in color, and growing coarser. No marked division between Nos. 5, 6, 7, and 8, though one that could not be located was suspected in the specimen marked 5, between sand and mud.				
6	Sand	21.3	4.7	40	20
7	Sand, 50 per cent	26.0	1.4	40	20
	Gravel, 50 per cent	.....	.....	10	6
8	Sand, 50 per cent	27.4	2.3	35	20
	Gravel, 50 per cent	.....	.....	6	1½″
9	Blue clay	29.7	0.9	2,000	400
10	Blue sand; small amount of lignite at 41 feet	30.6	13.4	50	20
11	Blue clay	44.0	0.2	2,000	500
12	Sand	44.2	9.8	30	>20
13	Sand, 75 per cent	54.0	3.5	30	20
	Gravel, 25 per cent	.....	.....	2	2″
14	Lignite of different ages	57.5	1.8	.....	.....
	Large pieces of lignite kept pump valves open and permitted sand which must have filled interstices to sift out. Nothing but lignite was brought up in the two pumps of material between 57.5 feet and 59.5 feet, every specimen showing evidence of wash.				
15	Sand, 25 per cent	59.3	1.8	30	20
	Gravel, 75 per cent	.....	.....	5	2″
16	Sand, 55 per cent	61.1	13.7	25	20
	Gravel, 45 per cent	.....	.....	12	2¼″
	Ball of sand, gravel, and lignite from depth of 62 feet.				
17	Sand, 67 per cent	74.8	10.4	30	20
	Gravel, 33 per cent	.....	.....	8	1¼″
18	Lignite, 10 per cent. (wash)	85.2	4.8	.....	.....
	Sand, 45 per cent	.....	.....	40	20
	Gravel, 45 per cent	.....	.....	3	2″
19	Sand, 67 per cent	90.0	4.0	50	20
	Gravel, 33 per cent	.....	.....	4	1¾″
20	Sand, 80 per cent	94.0	2.7	50	20
	Gravel, 20 per cent	.....	.....	12	4
21	Sand, 33 per cent	96.7	9.3	30	20
	Gravel, 67 per cent	.....	.....	2	>2″
22	Sand	106.0	4.3	50	20
23	Mud, 10 per cent	110.3	4.7	1,000	.....
	Sand, 23 per cent	.....	.....	50	20
	Gravel, 67 per cent	.....	.....	6	¾″
24	Sand, fine	115.0	5.0	150	50

Respectfully submitted.

E. H. WILSON,
Assistant, in charge.

Maj. CHARLES R. SUTER,
Corps of Engineers, U. S. A.

BORING No. 2.

Party No. 1 reached Fletcher's Landing, from Tiptonville, at 5 a. m., March 29, and were taken without delay by steamer, at 2 p. m., April 5. Stopped large pipe at 79 feet, and introduced 2-inch pipe. At 79.6 feet a well-preserved oak log was found with its several tenths hollow filled with gravel and sand. Drove through with great difficulty and reached a depth of 82.2 feet, when our very slow progress was attributed to the binding of log, and small pipe was withdrawn. The large pipe was withdrawn in our efforts, and, supposing that a ring of wood bound the two pipes together, the large pipe was held and small one driven away from it. The 2-inch pipe was pulled up without further difficulty. The 3-inch pipe was now driven through log and small pipe again lowered. At 98 feet 1,800 blows were required to sink pipe one inch. This extreme slowness of movement was accounted for on the final withdrawal of pipe by the discovery that the lowest length of 3-inch pipe had become detached and had followed 2-inch pipe. The difficulties from this cause were identical with those described in report upon boring No. 1. The threads of the eleventh joint of 2-inch pipe were broken off at shoulder, and the pipe had to be pulled up and new length substituted. On account of the many incidental accidents, which may be repeated in any boring, the pipe was sunk more than 210 feet.

No.	Apparently before drying.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Surface soil	0.0	3.8	1,000	100
2	Yellow clay	3.8	2.5	1,500	500
3	Yellow clay, with rusty streaks	6.3	3.2	<3,000	500
4	Blue clay	9.5	5.7	<2,000	300
5	Blue clay; when fresh, seemed more consistent than No. 4	15.2	0.6	<3,000	500
6	Blue clay, with vegetable matter	15.8	2.8	<3,000	500
7	Blue clay, without vegetable matter	18.6	3.3	<3,000	500
8	Blue clay, darker than No. 7	21.9	10.0	<3,000	500
9	Sand	23.8	6.3	.....	.....
	Consisted of some 3 or 4 layers of sand found in clay at intervals of from 6 to 10 inches. Owing to the churning of the pumps and their extreme thinness it was impossible to locate them more definitely or get a sample of them separate from the clay above and below them. They were not more than $\frac{1}{50}$ or $\frac{1}{100}$ of an inch in thickness.				
10	Sand	31.9	0.3	300	100
11	Blue clay; shows well-defined laminæ of very fine sand in clay.	32.2	0.8	<3,000	1,000
12	Sand	33.0	1.9	80	40
13	Blue clay	34.9	1.4	<3,000	500
14	Quicksand	36.3	0.6	150	100
15	Blue clay	36.9	1.6	<2,000	300
16	Quicksand	38.5	9.5	200	50
17	Cottonwood stick	47.0	.....	.....	.....
18	Quicksand	48.0	11.0	100	20
19	Clay	52.0	.....	.....	.....
	It is an isolated ball of clay found in sand at 52 feet.				
20	Gravel, 50 per cent	59.0	2.1	2″	>2″
	Sand, 50 cent	.....	.....	200	20
21	Sand	61.1	5.6	75	20
22	Sand	61.8	0.2	33	20
	Lignite and wood	.....	.....	.....	.....
23	Wood and vegetable mold	65.7	0.3	.....	.....
	Decayed vegetable matter, with very fine sand; average 200 to an inch.				
24	Gravel, 50 per cent	66.7	0.8	3	1¼″
	Sand, 50 per cent	.....	.....	33	20
25	Wood and lignite	67.5	0.2	.....	.....
26	Gravel, 5 per cent	67.7	1.9	4	1″
	Sand, 95 per cent	.....	.....	50	20
27	Cottonwood log	69.6	0.3	.....	.....
28	Gravel, 80 per cent	69.9	1.4	1	2¼″
	Sand, 20 per cent	.....	.....	40	20
	Contains decayed wood.				
29	Quicksand	71.3	3.7	150	30
30	Cottonwood stick and mold	74.0	.....	.....	.....
	With No. 30 was found a small lump of white clay, at 74 feet, in a stratum of cottonwood sticks and mold.				
31	Gravel, 45 per cent	75.0	4.6	2	1⅝″
	Sand, 55 per cent	.....	.....	40	20

No.	Apparently before drying.	Location of layers.		Diameter to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
32	Oak log, hollow, 1.6 feet in diameter; its interior filled with sand and gravel.	79.6	1.6	....	.....
33	Gravel, 50 per cent	81.2	11.4	2	3
	Sand, 50 cent	.....	.....	40	20
34	White clay	85.4	.....	.....	.....
	Consisted of a large gravel stone encased in clay; size 2⅛ by 1⅛ by 1⅝ inches; it was broken to enter sample bottle; with it were found several small lumps of clay; it came from a depth of 85 4 feet.				
35	Quicksand	92.6	5.4	120	30
36	Gravel, per cent	98.0	16.3	1″	>2″
	Sand, per cent	.....	.....	50	20
37	Sand	114.3	2.2	60	>20
38	Quicksand; it is noticeable for the uniformity of its particles.	116.5	5.7	80	50

Respectfully submitted.

E. H. WILSON,
Assistant, in charge.

Major CHARLES R. SUTER,
Corps of Engineers, U. S. A.

BORING No. 3.

Reached Plum Point Saturday, April 5, at 10 a. m., from Ashport, and were ready to leave on evening of 9th. The 3-inch pipe was sunk to depth of 80 feet without maul (see boring No. 1), but our experience forbade this method in lowering 2-inch pipe. No special difficulty was experienced in this boring, the only delay occurring by the undue and rapid "shooting" of sand. The tools, however, in the hands of skilled men, were not allowed to be imprisoned.

Specimen No. 12 was reported as occurring in specimen 11. Believing from past experience that this clay rested upon the fine sand contained in specimen 13, a second boring was made, 3 feet distant, and the correctness of the theory established.

No.	Apparently before drying.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Sandy loam	0.0	0.8	1,000	200
2	Sandy clay	0.8	0.3	500	200
3	Fine sand	1.1	0.5	350	200
4	Sand	1.6	1.1	200	50
5	Clay in laminæ of ¼ inch in thickness	2.7	1.0	1,000	200
	Specimen not thoroughly dried to preserve the distinctness of laminæ.				
6	Decayed wood and sand	3.7	0.2	.....	.....
7	Sandy clay, mould	3.9	0.1	1,000	.....
8	Bluish clay	4.0	1.1	2,000	5,000
	As usual in finding clay, upper part of stratum is of very fine texture, growing coarser, and running into sand on descending.				
9	Sand, fine	5.1	0.4	600	200
10	Sand, coarse	5.5	0.5	80	30
11	Sand, light color	6.0	10.3	100	50
12	Brown-colored clay	16.3	0.05	1,500	.....
13	Quicksand	16.35	4.65	100	>20
14	Sand, 50 per cent	21.0	10.3	100	20
	Gravel, 50 per cent	.....	.....	6	2″
	Great lack of uniformity in sand. Two unbroken specimens of gravel preserved.				
15	Coarse sand and grave; too little in amount to estimate	31.3	11.1	50	20
16	Bluish clay	37.4	.....	<3,000	.....
	Supposed to be a stratum (?)				

No.	Apparently before drying.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
17	Decayed wood of fine texture	38.4	.....	.....	.....
18	Sand	42.4	19.1	100	20
19	Brown-colored clay	61.5	0.1	.....	.....
	Clay (nodules ?) encrusting gravel.				
20	Sand, dark in color	61.6	8.4	40	20
21	Sand, and a small amount of gravel	70.0	5.2	120	20
22	Coarse sand	75.2	13.2	40	20
23	Sand, 95 per cent	88.4	10.3	33	20
	Gravel, 5 per cent	.....	.....	10	$\frac{3}{16}''$
24	Sand, 20 per cent	98.7	7.3	40	20
	Gravel, 80 per cent	.....	.....	5	$>2\frac{1}{4}''$
25	Sand, 25 per cent	106.0	9.0	100	20
	Gravel, 75 per cent	.....	.....	6	1
	Noticeable on account of large proportions of diameters less than $\frac{1}{1000}$.				
26	Quicksand	115.0	2.6	100	30
	Noticeable on account of large proportion of diameters less than $\frac{1}{1000}$.				
27	Gray sand	117.6	1.2	50	20
	All specimens contain matter <3,000 D. to an inch.				

Respectfully submitted.

E. H. WILSON,
Assistant, in charge.

Maj. CHARLES R. SUTER,
Corps of Engineers, U. S. A.

BORING NO. 4.

Arrived at site boring No. 4, Saturday, April 5, at 4 p. m., and were ready to leave on Wedesday, April 9, at 12 m.

No delays occurred excepting a slight one of one-half hour on the morning of April 7, on account of rain.

After sinking the 3-inch pipe to 50 feet it was necessary to sink the small one, as party No. 2 had drawn on us for the remainder of our 3-inch in order to make some very deep borings in the vicinity of Fort Pillow. In consequence, driving was very hard, and when the pipe had reached 113.7 feet, the boring was pronounced completed, being then deep enough to meet all requirements.

No.	Apparently before drying.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Surface soil	0.0	2.5	<2,000	500
2	Sandy clay, with rusty streaks	2.5	12.0	<2,000	500
3	Very fine reddish sand	14.5	2.7	1,000	150
4	Blue clay, streaked with black	17.2	0.2	1,500	500
5	Reddish sand	17.4	3.6	100	50
6	Blue clay	21.0	1.2	<2,000	1,000
7	Fine gray quicksand	22.2	12.5	300	20
8	Blue clay	34.7	0.2	1,000	500
9	Fine gray quicksand	34.9	8.9	300	50
10	Blackish clay	43.8	0.05	2,000	1,000
	Lignite	.....	.....	.....	.....
11	Gray quicksand	43.85	1.45	20	75
12	Blue-black clay	45.3	2.2	<2,000	1,000
13	Sand	47.5	2.5	125	20
	Decayed wood	.....	.....	.....	.....
14	Gravel, 15 per cent	50.0	2.5	$\frac{3}{8}''$	$1\frac{7}{4}''$
	Sand, 85 per cent	.....	.....	50	20
	Lignite	.....	.....	.....	.....
15	Gray sand	52.5	9.3	80	20
16	Gravel, 40 per cent	61.8	0.6	10	2
	Sand, 60 per cent	.....	.....	75	20

No.	Apparently before drying.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
17	Sand	62.4	8.1	75	20
18	Gravel, 35 per cent	70.5	13.5	10	1
	Sand, 65 per cent	.....	.....	40	20
19	Gravel, 4 per cent	84.0	11.4	.....	.....
	Sand, 96 per cent	.....	.....	40	20
	The gravel were too few to form the basis of an analysis. The sand contained a great proportion of very fine material.				
20	Gravel, 40 per cent	95.4	1.4	5	2
	Sand, 60 per cent	.....	.....	50	20
21	Gravel, 80 per cent	96.8	4.7	2	1¼
	Sand, 20 per cent	.....	.....	75	20
22	Sand	101.5	12.2	75	20

Respectfully submitted.

E. H. WILSON,
Assistant, in charge.

Maj. CHARLES R. SUTER,
Corps of Engineers, U. S. A.

BORING No. 5.

Landed at Fulton, Tenn., from Plum Point, April 10, and left April 17. Boring No. 5 was located on a low, narrow shelf formed by the denudation of the material (overlying a blue clay stratum), which was a continuation of a comparatively recent 12-foot deposit of earth in the narrow valley in which Fulton lies.

The blue clay found at 6.4 feet forms, for some distance, the bed of the little creek emptying into the river one hundred yards north.

It is inferred from this fact that the strata passed through are in their original relative positions.

The specimens from 1 to 5, both inclusive (from 0 to 3.9 feet), belong, undoubtedly, to recent river deposits and washings from the valley deposit adjacent.

The blue clay stratum underlies the bluff formation, the lower part of which, as is shown in specimen No. 6 (between 3.9 and 6.4 feet), has resisted the valley eroding forces.

This bluff, judged superficially, would be pronounced a yellow joint clay.

Examination, however, shows it to be a calcareous deposit belonging to the Eocene period of the Tertiary age, as is proved:

1st. By the shells of mollusks, a few of which are found entire, and are preserved among specimens of the boring.

2d. By the effervescence of the yellowish-white earth, composing the great part of the deposit, on the application of acids.

3d. By the irregularly-shaped limy stones (probably corals) found in great numbers in face and at foot of bluff.

4th. By the position of the upper strata in relation to the lignitic Tertiary beds found at 106 feet, 112.7 feet, and 127.2 feet.

The bluff shows a vertical face of 25 feet or more above the elevation of the zero of boring.

The shell beds found in the boring proper, disclose their character only on application of acids. The calcareous matter in these strata is in a comparatively small proportion.

The 3-inch pipe was used exclusively here, and sunk without the aid of maul to a depth of 118.8 feet, and altogether, 129.8 feet.

The remaining depth was attained without sheathing; the last seven-tenths foot by use of the "pot auger."

The sand beds were passed through without difficulty, and it was remarked that no great rise of material in the pipe interrupted the progress of work.

The bed of blue clay uncovered by creek north of boring has a great many holes from 1 to 3 inches in diameter. On digging into side of channel, these holes are found to be filled with shell remains and white earth. The coloring is quite brilliant—from center, white, then a maroon, then shades of yellow, paling to the blue of clay stratum.

A section is preserved. The only geological interest it might have would be determined by the shell remains in the excavation. These *might* be washings from the

calcareous deposit above, as the remains are not distinguishable, but they are believed to be local.

The blue clay (?) seems to be in nearly vertical joints at right angles, with, however, no spread, as in mud cracks. The surfaces of joints are of a rich maroon color. This jointed character prevails in the bluff formation also.

The creek-bottom deposit of more recent formation, 8 or 10 feet above bed of creek, shows several hundred or more distinct growths, neither uniform nor horizontal. A section of a basin filled with clay nodules—soft—is shown immediately under a bed of clay; and under clay is also shown, 8 feet beneath surface, a foot of vegetable matter, principally leaves, whose vein-tracings are yet distinct.

No.	Apparently before drying.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Fine sand	0.0	0.6	600	200
2	Sandy clay	0.6	1.0	1,000	300
3	Sand; lumpy	1.6	0.1	500	100
4	Clay; rusty-streaked	1.7	2.0	<3,000	500
5	Sandy clay; lumpy, rusty-streaked	3.7	0.2	<3,000	1,000
	Contained occasionally reddish-brown sandy clay, 25 per cent. of this specimen <3,000 D. to an inch. From 5.8 feet to 6.4 feet clay is reddish-brown and crumbles readily.				
6	Clay; gray and iron-rust colors E.	3.9	2.5	<3,000	2,000
7	Blue clay	6.4	13.2	<3,000	2,000
	Near the top of this stratum whitish streaks were noticed, supposed to be decayed shells; 10.5 feet clay is mottled in appearance; 11.22 feet thin layer of fine brown sand 0.01 inch thick; 12 feet some decayed wood-clay, darker near wood; 15.7 feet coarser in texture; almost quicksand, pasty. E.				
8	Dark-blue clay	19.6	10.4	<3,000	2,000
	Pasty; 26.5 feet dark coarse sandy clay, containing some gravel; 26.6 feet a green streak ¼ inch thick; 26.6 feet to 29 feet, increases in coarseness with descent; 29 feet sandy clay. Below this color was darker. E.				
8 A	Dark clay, woody material, and shells E.	21.0	1.3	<3,000	1,000
9	Clear quartz sand, 50 per cent	30.0	0.7	100	40
	Gravel, (clay nodules and gravel and shells in clay)	.....	.....	.....	3/10″
	Noticeable for difference in size of particles. E.				
10	Gravel, 75 per cent	30.7	2.1	3	1 3/16
	Sand, 25 per cent. with calcareous earth E.	.....	.....	100	20
11	Dark-blue clay	32.8	1.0	3,000	
	Sand and gravel in bedded gravel E.	.....	.....	.....	6
12	Gravel, 80 per cent	33.8	10.7	2	2 3/4
	Sand, 20 per cent	.....	.....	50	20
	Several lumps of light pasty clay encircling gravel through the stratum.				
13	Clay layers	44.5 49.0 51.2 56.7 57.2 58.0 58.7 59.7 61.2 62.0	0.05 0.02 0.1 0.05 0.05 0.05 0.03 0.1 0.1 0.1	.....	.....
	The different layers of clay marking the top of successive sand layers in sand stratum, between 44.5 feet and 98.6 feet, are, excepting the clay between 44.5 feet and 44.55 feet, about alike as to texture, etc.				
14	Sand	44.55 49.02	4.45 2.18	150	20
15	Dark-gray sand	51.3 56.75 57.25 58.05	5.4 0.45 0.75 0.65	200	50
16	Dark-gray sand with "mud"	58.73 59.8 61.3	0.97 1.4 0.7	300	50
17	Dark-gray sand, particles of wood, and lumps of clay	62.1	10.8	150	50
18	Dark clay	72.9 76.3	0.1 0.03	<2,000	100
	Traces of decayed vegetation.				
1	Coarse sand, clay lump, or concretion	73.0 76.33 95.8	3.3 19.27 2.8	100	40

No.	Apparently before drying.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
20	Dark "greasy clay"	95.6	0.2	1,000	100
	Streaks of decayed wood. Very narrow streaks of decayed vegetable matter found in all positions, from horizontal to vertical. Cannot determine whether or not they are of local growth.				
21	Dark clay (?)	98.6 106.15	7.4 5.65	500	100
22	Lignitic formation; black folded appearance	106.0	0.15		
23	Dark clay	111.8	0.9	1,000	500
	Decayed wood in streaks.				
24	Lignitic formation	112.7	6.1	.....	.....
	Where cut looked glossy and felt greasy. Clay both above and below this layer. In each case the lignite blended together, change not being abrupt.				
25	Clay, with rootlets from above	118.8	2.9	.....	.....
	Coarseness of clay increases uniformly with descent.				
26	Coarse gray sand	121.7	3.7	50	20
	At 122.7 feet a laminæ of clay $\frac{1}{20}$ inch thick; at 124.7 feet a luminæ of clay $\frac{3}{4}$ inch thick. In each case fine sand was found under the clay, increasing in coarseness with the descent.				
27	Dark sand	125.4	1.8	200	50
	A very small amount of lignite at 126.2 feet. Could not determine whether or not a layer.				
28	Lignitic formation, brownish-black	127.2	7.5	.....	.....
	At 132.2 feet small amount of lignite.				
29	Gray sandy clay top of stratum	134.7	.....	Mud and	sand.
	Increases uniformly in coarseness with the descent, becoming quicksand.				
30	The gradation is shown between Nos. 29 and 30	138.0	.....	350	100

Every specimen contains particles of diameters of less than 3,000 to an inch.
"E," effervescing on application of nitric acid.
Respectfully submitted.

E. H. WILSON, *Assistant, in charge.*

Maj. CHARLES R. SUTER, *Corps of Engineers, U. S. A.*

BORING No. 6.

Arrived at Judge Bowen's place Wednesday, April 9, 1879, at 4 p. m., and were ready to leave Monday, April 14, 1879, at 6 p. m. In this boring no 3-inch pipe was used, owing to our having so little of it, and the 2-inch was sunk from the beginning.

Fifty-seven feet were made without driving. At 114 feet the pipe rested in a bed of blue clay, and was driven no further. The pumps were then worked down through the clay, beyond the pipe, a distance of 26.5 to 140.5 feet, and the boring completed. This shows that through stiff, consistent material, the pumps may be worked beyond the pipe, so long as the material remains stiff enough to prevent its caving and obliterating the hole made by the pipe in its passage.

This boring was made quite rapidly, and with no accident, save the breaking of the threads of a length of pipe, necessitating pulling up from 57 to 49 feet, to replace it.

No.	Apparently before drying.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Surface soil and vegetable matter	0.0	0.5	<2,000	1,000
	Being taken from a stable yard contained a large amount of animal matter which became blackened by heat in drying.				
2	Yellow surface clay	0.5	5.9	<3,000	<2,000
3	Gradation. Blue clay with rusty streaks	6.4	3.2	<3,000	1,000
4	Blue clay, clear	9.6	13.1	<3,000	<2,000
5	Blue clay, nearly black	22.7	4.1	<3,000	<3,000
6	Blue clay	26.8	0.2	<3,000	<3,000

No.	Apparently before drying.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
7	Quicksand	27.0	12.0	150	50
8	Blue sandy clay	39.0	2.1	1,000	300
9	Gravel, 2 per cent	41.1	9.6	2	2
	Sand, 98 per cent	.....	.....	100	20
	The gravel in this consisted of only a few stones scattered here and there.				
10	Gravel, 10 per cent	50.7	19.8	4	<2″
	Sand, 90 per cent	.....	.....	60	20
10 A	Nodules of blue and white clay	62.0	5.0		
	Consists of small balls of blue clay found from 62 to 69 feet, and a few balls of white clay at 63.5 feet. They existed as nodules in a bed of gravel and sand.				
11	Gravel, 35 per cent	70.5	7.0	$\frac{7}{8}$″	<2″
	Sand, 65 per cent	.....	.....	50	20
12	Lignite	77.5	0.8		
13	Dark coarse sand	78.3	1.7	75	20
14	Gravel, 15 per cent	80.0	5.0	3	$\frac{3}{4}$″
	Sand, 85 per cent	.....	.....	50	20
15	Lignite	85.0	0.2		
16	Sand	85.2	2.0	30	20
17	Gravel, 35 per cent	87.2	20.9	8	1
	Sand, 65 per cent	.....	.....	50	20
18	Gravel, 90 per cent	108.1	1.7	8	<2″
	Sand, 10 per cent	.....	.....	50	20
	The sand in this contains a very great proportion of exceedingly fine material.				
19	Fine sand, mud, and lignite	109.8	0.3	30	>20
20	Blue clay	110.1	9.9	<3,000	1,000
21	Blue clay, more sandy	120.0	4.8	<3,000	1,000
22	Blue clay, soft and sandy	124.8	1.2	<2,000	300
23	Blue clay, hard and consistent	126.0	14.5	<3,000	1,000
24	Blue clay	140.5	.....	<3,000	1,000

Nos. 20, 21, 22, 23, and 24, are taken at intervals from a continuous stratum.

Respectfully submitted.

E. H. WILSON,
Assistant, in charge.

Maj. CHARLES R. SUTER,
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BORING No. 7.

Arrived at Fort Pillow, Tenn., from Fletcher's Field, June 12, and left at 1.40 p. m. on 21st instant for the New Madrid Reach. The boring is coupled with a section of the bluff, taken 200 yards below the landing, which fairly represents the irregular layers constituting the bluff deposit. Among the noteworthy material not shown in specimens are—

1st. A very hard puddingstone conformable with gravel bed in section, which, in layers farther down the river, is very hard and compact, the cementing material being iron.

2d. Infrequent and irregular beds of very hard argillaceous shale, sometimes several feet thick.

Quite interesting features of the boring are the iron and sand conglomerates occurring at 208.5 feet and below, as concretions in the clay beds. For the sake of simplicity in notation, the bluff section and boring proper have been coupled, so that the depth of specimens reads from the top of bluff as a zero continuously.

The zero of the boring proper equals in the notation 141.5 feet. Though the boring was located where there was no evidence of a slide, fragments of a brick found at a depth of 20 feet were located as such, and in consequence an extra boring was made to a depth of 37 feet, which carried the samples without break past the slide into the conformable bluff deposit. At 201.1 feet a very hard clay stone broke two steel drill-rods, and was not passed until mauled through. This is the first specimen of "rock" as a layer found in any of the borings. Fragments of a close-grained wood, probably hickory—part of the petrifaction of a nearly entire tree—was found in a ravine half

a mile south of a point 2 miles above the mouth of Cold Creek, and are preserved. Petrifactions and fossils are preserved from the gravel layer of bluff.

No.	Apparently before drying.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Light-brown clay. Grows darker and finer in texture with the descent. The sample is from 0.5 foot.	0.0	63.3	800	300
1 A.	A sample from 8 feet	8.0	.....	900	500
2	Brown clay	63.3	8.8	1,500	500
3	Red sand, 90 per cent	72.1	12.0	80	20
	Gravel, 10 per cent	.....	.....	8	1
4	Yellow sand, 10 per cent	84.1	14.6	90	20
	Gravel, 90 per cent	.....	.....	2	2½ ft.
	The coarseness of the gravel increases with the descent.				
5	Yellow and gray sandy clay. Grows finer in texture and darker with the descent. Sample is from 100 feet.	98.7	13.3	400	200
6	Brown and yellow clay. The sample is from 113 feet	112.0	2.1	1,000	500
7	Gray sand	114.1	8.2	150	80
8	Bluish clay	122.3	8.5	750	500
9	Black lignite. The upper portion of this layer contains fine sand.	130.8	1.5	.....	.....
10	Brown clay. The upper part of this layer contains some lignite. Sample is from 134 feet.	132.3	8.2	1,000	400
11	Gray sand. From 140.5 to 144 feet several layers (varying from ¼ inch to 2 inches in thickness) of brown clay, occur. This clay is similar in color to No. 10. Sand contains particles of lignite.	140.5	12.0	150	80
12	Bluish sandy clay. Stiff. At 153.2 feet clay contains some lignite; thence, amount of lignite increases with the descent.	152.5	2.2	1,000	100
13	Brown lignite	154.7	2.9	.....	.....
14	Stiff, light-brown clay. Contains lignite; becomes very stiff and changes to bluish on descending.	157.6	4.7	3,000	.....
15	Brown lignite	162.3	0.2	.....	.....
16	Stiff, bluish clay. Contains some lignite; grows coarser and contains brown clay on descending. The sample is from 164 feet.	162.5	6.0	3.000	.....
17	Brown lignite	168.5	0.3	.....	.....
18	Light-brown clay. Contains lignite to 174 feet; thence it is soft, brown clay, containing streaks of bluish clay.	168.8	8.3	3,000	500
19	Bluish sandy clay. Coarseness increases slightly on descending. Sample is from 178.5 feet.	177.1	24.0	500	125
20	Clay stone. This was brought up in fragments.	201.1	0.15	<3,000	.....
21	Brown sandy clay. Some hard gray clay occurred at 201.4 feet; quantity equal to a layer ½ inch thick.	201.25	2.25	500	100
22	Light-brown clay. The upper part of this layer contains some lignite. This layer is similar in color and texture to that usually found under a layer of lignite.	203.5	1.4	<3,000	.....
23	Grayish clay; contains sandy streaks	204.9	1.1	2,000	100
24	Brownish clay. Sandy streaks occur frequently; most of the clay came up as pasty clay.	206.0	50.3	1,000	150
24 A.	Sand conglomerate, containing iron, from 208.5 feet. At 227.5 feet some very hard, stiff clay occurred, equal in quantity to a layer ½ inch thick. From 233.5 feet thence, clay is coarse and contains sandy streaks. From 251.5 feet clay grows darker.				
25	Black lignite. From 275.1 feet thence, lignite contains some brown clay.	256.3	1.2	.....	.....
26	Brown clay. Contains some lignite. Clay is sandy at 260.1 feet, 271 feet, and 291.5 feet. Thin layers of hard, fine clay occur at 272.5 feet, 290.5 feet, 296 feet, and 298 feet. The color varies from light brown to brown. At 281.5 feet a small sand conglomerate, similar to 24 A, was found. The sample consists of several lumps of clay.	257.5	44.0	2,000	200
27	Dark gray sand. From 306.5 feet sand is darker	301.5	8.6	80	50
28	Brown clay. Thin layers of sand occur frequently	310.1	5.4	2,000	500

No.	Apparently before drying.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
29	Blue clay; becomes lighter in color on drying..... At 333.5 feet clay is sandy. Several small sand conglomerates, similar to 24 A, occurred in this layer. Boring ended at 341.5 feet.	315.5	26.0	3,000	200

Respectfully submitted.

E. H. WILSON, *Assistant, in charge.*

Maj. CHARLES R. SUTER, *Corps of Engineers, U. S. A.*

BORING No. 8.

Arrived at boring No. 8, by wagon and steamer, from boring No. 6, on Tuesday, April 15, at 3 p. m., and were ready to leave Monday, 21st, at 6 p. m.

A depth of 122.5 feet was reached, which, on account of scarcity of pipe, was the greatest depth attainable. Having no 3-inch pipe, the 2-inch alone was used.

Considering the small depth attained and the time consumed, the progress made can hardly be called satisfactory, although owing to accidents encountered.

All of Wednesday (16th) was lost on account of rain, which fell abundantly and incessantly during the day. On Thursday, 84 feet was reached. On Friday, at 94 feet, the pipe broke, 14 feet below the surface, necessitating the digging of a well; this caved so badly that curbing had to be procured; when, finally, the broken pipe was reached, the combined use of levers and pulleys was required to draw it, it offering such resistance that the tripod legs of the derrick were forced into the ground more than one foot during the operation. This was accomplished on Saturday afternoon, and 94 feet again reached that evening. Monday, completed the work without further difficulty.

At 13 feet, when digging for the pipe, a layer $\frac{1}{8}$ inch thick, of well-preserved leaves, was found in a stratum of blue clay.

After drawing the pipe, its mouth was found split, distorted, and flared out, with the shoe broken, and the fragments partially forced into the pipe.

No.	Apparently before drying.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Surface soil	0.0	3.7	<3,000	750
2	Yellow, sandy clay	3.7	3.7	<3,000	<2,000
3	Blue clay, with rusty streaks	7.4	2.2	<3,000	<3,000
4	Blue clay..... Clear. Presented some curiously mottled streaks and patches of coarser, sandy material.	9.6	16.0	<3,000	<3,000
5	Blue clay..... Bottom of stratum. Presented some curiously mottled streaks and patches of coarser, sandy material.	25.6	0.2	<3,000	<3,000
6	Dark quicksand..... Very uniform in size of particles.	25.8	24.6	125	75
7	Blue clay	50.4	0.8	<3,000	<3,000
8	Dark quicksand..... Very uniform in size of particles.	51.2	2.8	125	75
9	Gravel, 15 per cent	54.0	1.6	2	$1\frac{3}{4}$″
	Sand, 85 per cent	.....	.....	100	20
10	Quicksand	55.6	17.4	100	30
11	Gravel, 15 per cent	73.0	5.4	3	$\frac{3}{4}$″
	Sand, 85 per cent	.....	.....	30	20
12	Gravel, 60 per cent	78.4	21.2	2	$1\frac{1}{2}$″
	Sand, 40 per cent	.....	.....	30	20
	Lignite	.....	.....	.....	.....
13	Sand	99.6	22.9	40	>20

Respectfully submitted.

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Boring No. 9.

Arrived at Johnson's Landing, Tenn., on old Island No. 29, April 26, 1879, and completed boring on May 14.

As nearly all the causes of delay heretofore met, and several entirely new difficulties were overcome, it has been thought that an extended account of the mechanical features of the boring would not be uninteresting.

Monday, April 28.—Raised derrick. Put auger to 10.5 feet. Three-inch pipe sunk, by twisting, to 68 feet. Greatest rise of sand in pipe, 10 feet.

Tuesday.—Continued sinking pipe, by twisting, to 111 feet; greatest rise, 8 feet.

Wednesday.—Continued sinking pipe, by twisting. At 120 feet, sand shot through and above pump, fastening it in pipe; wire rope broke 60 feet above pump. Pulled up pipe 2 feet; secured pump and drove pipe away from it; this freed it from binding of sand. The 60 feet of wire rope now settled around rods, fouling them. Alternately drove and pulled pump rods, and finally brought pump to surface. Now, after mauling pipe to free pump, pipe could not be turned. Mauled pipe to 126 feet.

Thursday.—Could not reduce elevation of sand in pipe to less than 4 feet from bottom. By continuous mauling reached 136 feet.

Friday.—Drove, with two mauls, to 146 feet; average number of blows to an inch, 240. Sand generally about 6 feet in pipe, rising as fast as pumped out.

Saturday.—Sank pipe to 149 feet, 3 feet in 4 hours' continuous mauling. After reducing height of sand in pipe as much as possible, 6 feet, lowered 2-inch pipe, which touched sand within 3-inch pipe at 139 feet. Drove continuously, and quit at 147.7 feet.

Monday.—Hoped that after driving out of 3-inch pipe our progress would be more speedy. At 150 feet 500 blows sank pipe one-eighth of an inch. At 150.2 feet struck clay. Bored ahead of shoe of pipe, which, by still driving hard, showed that the 2-inch and 3-inch pipe were bound together. Quit at 154.8 feet.

Tuesday.—Fourteen hundred blows to 1 inch. Concluded to pull up 2-inch pipe and sink 3-inch pipe to clay at 150.2 feet, thus freeing pipe from the binding influence of sand between. Broke several heavy levers. Finally started both pipes upward, pulling on 2-inch pipe. Held 2-inch and drove 3-inch away from it. Putting a steady strain of 15 tons on 2-inch pipe, the thread of the sixth length parted. Drew out upper 10 lengths of 2-inch pipe.

Wednesday.—Pulled on 3-inch pipe, trusting that the pipes were bound tightly enough to come together. They parted, and it became necessary to couple them to secure the 6 lengths of 2-inch pipe resting 155 feet under ground. Put down gravel pump to 90 feet, the top of gravel pump being 2 feet beneath broken length, and poured in gravel and sand, which not only was expected to foul pump but also to enter between surfaces of 2 and 3 inch pipe and couple them. By drawing the 3-inch pipe about 10 inches the sand was settled thoroughly between the different surfaces, and pulling up on 3-inch pipe and putting a strain of 2 tons directly on 2-inch pump, through rods and pump and with differential blocks, the lost links came in sight.

Thursday.—Five hours were occupied in pulling up and separating the remaining lengths and extracting the gravel pump from the 2-inch pipe. Recommenced sinking 3-inch pipe, and stopped at 81 feet.

Friday.—Twisted down 3-inch pipe to 149 feet.

Saturday.—Left 3-inch pipe in clay bed at 151 feet, and introduced 2-inch pipe, which was sunk by mauling to 170.7 feet.

Monday.—While lowering, the wire rope broke, and the auger and 150 feet of pump rods dropped out of sight. A hinged steel valve was fixed into a piece of 1½-inch gas pipe so that pipe could be dropped over the end of rods. When raised the valve dropped and secured pump rods between cutting edge of valve and interior surface of gas pipe. A heavy pull brought up the rods. Quit at 175 feet.

Tuesday.—The lignite passed through was so compact and tenacious that the plated valves of all the pumps were broken. Leaving 2-inch pipe at 175 feet, we pumped below, through clay, lignite, and 2 feet of sand, to 198.1 feet.

Wednesday.—The sand found at 196 feet continually caved, and a great deal of material was brought up in reaching 200 feet. This done, pulling up pipe commenced and was accomplished without further difficulty.

At 104.7 feet were found calcareous remains, whether drift or local none of the strata or layers immediately preceding or succeeding aid the judgment in determining.

The clay found at 150.2 feet presents the same characteristics that the clay underlying beds of lignite found at boring No. 5 discloses, being filled with vegetable matter. This vegetation is the first certainly local growth met with in boring, and it is thought to mark the limit of scour of the forces furrowing out the river bed through the original Tertiary formation found undisturbed in the river bluffs in the vicinity. At 173.3 feet a bed of brown-colored lignite, 2.7 feet thick, was found, belonging, undoubtedly, to the Eocene Tertiary period.

No shell remains or calcareous matter could be discovered, either with the eye or with acids, excepting that mentioned at 104.7 feet.

No.	Apparently before drying.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Sand, growing darker and finer From 1.8 streaks of reddish-brown color.	0.0	2.0	400	200
2	Clayey sand, growing more clayey	2.0	0.7	1,000	300
3	Dark, sandy clay Crumbles readily, growing more sandy to 3.5 feet; from 3.5 feet to 4 feet more clayey; thence no change. This layer contains some bark and decayed wood.	2.7	2.8	800	250
4	Sandy clay	5.5	0.9	1,500	500
5	Sand	6.4	0.2	400	200
6	Sandy clay Composed of gray sandy clay and reddish-brown sandy clay, gradually changing to sand. Contains some twigs.	6.6	1.0	800	400
7	Reddish-brown sand, with streaks of a lighter color	7.6	6.6	350	200
8	Bluish clay, with some of a reddish-brown color The change to the next layer is gradual.	14.2	1.2	1,500	1,000
9	Clayey sand of a dark-gray color	15.4	1.3	500	250
10	Bluish clay The upper part of this layer is of very fine texture and pasty. The coarseness increases with the descent to 22.1 feet, where it is a dark, fine quicksand. When breaking up the clay after drying, parts of small shells were noticed. It was impossible to preserve any of them, as they were so few and fragile. Contains some wood.	16.7	5.4	1,500	1,000
11	Dark quicksand	22.1	11.5	400	250
12	Dark sand, 20 per cent	33.6	10.9	100	20
	Gravel, 80 per cent	.....	.....	10	$3\frac{1}{4}''$
	The upper part of this layer is 15 per cent. gravel and 85 per cent. sand. The proportion of gravel increases with the descent. At 35 feet it is 75 per cent. gravel and 25 per cent. sand; at 38 feet it is 90 per cent. gravel and 10 per cent. sand. The largest gravel stone ($3\frac{1}{4}$ by 2 by 1 inch) was found at 34.1 feet (preserved). Although it was broken by the pump, all the pieces were brought up, placed together, and the stone measured. At 38.5 feet some dark, fine clay, equal in quantity to a layer $\frac{1}{4}$ inch thick. Cannot tell whether or no it is a layer. There is no apparent change in either color or texture of the sand above and below this clay.				
12 A.	Dark clay, sand, gravel, and a piece of lignite All mixed together, the quantity being equal to a layer $\frac{1}{8}$ inch thick. Four gravel stones from this layer (No. 12) are preserved and labeled with the respective depths at which they were found.	43.0	0.05	.....	.....
13	Gravel, 90 per cent	44.5	8.7	12	1
	Sand, 10 per cent	.....	.....	33	20
	The sample contains the largest gravel stone. At 53 feet some pieces of cane-root and a piece of cottonwood preserved.				
14	Dark clay Containing small roots, sand, and a few small pieces of lignite and gravel. As this came up with gravel and sand it is probable that most of the gravel with the clay belongs to the adjacent layer of gravel and sand. Immediately under the clay is fine sand.	53.2	0.1	1,000	100
15	Dark sand Contains a few particles of gravel and some lignite in particles.	53.3	4.7	125	20
16	Dark sand, 75 per cent	58.0	5.5	80	20
	Gravel, 25 per cent	.....	.....	6	$2\frac{1}{8}''$
	Largest gravel $2\frac{1}{8}$ by $1\frac{3}{4}$ by $1\frac{1}{2}$ inches. Several gravel stones (preserved) are recorded as coming from 59 feet. When the pipe was at 58 feet there was a rise of 10 feet. These stones were found near the top of the material that rose. This layer contains many large gravel stones; 5 are preserved. The sand grows lighter in color with the descent.				
17	Sand, 95 per cent	63.5	4.0	80	20
	Gravel, 5 per cent	.....	.....	12	2″
	This layer contains particles of lignite. Largest gravel (2 by $1\frac{3}{16}$ by $\frac{9}{16}$ inches) preserved.				
18	Dark sand, 95 per cent	67.5	3.6	100	20
	Gravel, 5 per cent	.....	.....	2	2″
	Small gravel stones occur frequently. Largest gravel stone (2 by $1\frac{1}{2}$ by $\frac{3}{4}$ inches) preserved.				

No.	Apparently before drying.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
19	Gravel, 80 per cent	71.1	13.6	8	2⅛
	Sand, 20 per cent	.....	.....	33	20
	Largest gravel stone preserved (2⅛ by 1⅛ by $\frac{4}{16}$ inches). At 76 feet a few rounded pieces of lignite and a stone preserved. At 77 feet a few pieces of lignite, a lump of coarse, sandy clay, and two gravel stones, all preserved. At 82 feet an argillaceous stone, resembling a ring, preserved. Several stones of this layer are preserved.				
20	Gravel, 30 per cent	84.7	4.3	5	1.4″
	Dark sand, 70 per cent	.....	.....	75	20
	Gravel stones occur frequently. The sample contains a light-colored stone containing fossils.				
21	Gravel, 75 per cent	89.0	15.7	6	3′
	Sand, 25 per cent	.....	.....	70	20
	Largest, 3 by 2¼ by 2 inches. At 90.7 feet some pieces of lignite. Two large gravel stones are preserved.				
22	Dark clay	104.7	3.5	<3,000	.....
	Underneath is fine sand. When the clay was dried it showed streaks of a light color in some places. It contained many small, light-colored, calcareous remains, which effervesced when nitric acid was applied. The interior of these calcareous remains is of a greenish-black color.				
23	Gravel, 95 per cent	108.2	4.0	6	3″
	Coarse sand, 5 per cent	.....	.....	33	20
	Largest gravel stone 3 by 2 by >1½ inches. The upper part of this layer is fine sand. The sand increases in coarseness on descending. At 109 feet it is 95 per cent. gravel and 5 per cent. coarse sand. This layer contains many pebbles. When the pump was at 111.2 feet it brought up 18 pebbles averaging 1 inch in diameter. Four large gravel stones are preserved.				
24	Dark sand	112.2	4.3	80	20
	Contains a few particles of lignite.				
25	Gray sand, 80 per cent	116.5	4.7	80	20
	Gravel, 20 per cent	.....	.....	12	1½″
	A fossiliferous stone (1½ by 1¼ by ⅝ inch) from 120 feet preserved.				
26	Dark sand	121.2	29.0	400	80
	The coarseness increases slowly with the descent. At 144 feet a few gravel stones, preserved; at 145 feet two gravel stones, preserved; at 147 feet a few gravel stones, sand is a little coarser, and contains a few particles of gravel. At 150 feet a *moss agate*, a fragment of which is preserved.				
27	Very dark clay	150.2	4.8	2,000	1,000
	Containing some decayed woody material. Clay is almost black near the top of this layer; becomes lighter with the descent. Toward the bottom of the layer it is brownish-gray clay.				
28	Gray sand	155.0	5.0	150	60
	The upper part of this layer is of a brownish color, but grows lighter with the descent. At 155.6 feet and thence it is gray sand. At 156 feet two small conglomerates (preserved) showing sand and metallic particles.				
29	Dark clay	160.0	2.0	2,000	1,000
	Containing some woody material and some clay of a gray color, coarser than the dark clay; contains some sand probably from adjacent layer of sand.				
30	Brown sand	162.0	3.4	125	80
	While the pump was being lowered to this layer water ran over at the top of the pipe freely. Particles are not uniform in size. The sand is hard and lumpy when dry. At 163 feet it is brownish-gray; thence no change.				
31	Gray clay	165.4	0.8	800	200
	Containing some decayed woody material. When exposed to the air turns brown, but grows lighter again on drying. The coarser sand found on the outside of clay in sample is probably from the adjacent layer of sand.				
32	Brown sand	166.2	0.5	125	80
	The particles are not uniform in size. Sand consists of hard lumps when dry.				
33	Grayish and brownish sandy clay	166.7	0.2	700	200
	Becomes darker on drying. Contains some woody material.				
34	Brown sand	166.9	1.1	125	80
	Particles not uniform in size. Consists of hard lumps when dry.				

No.	Apparently before drying.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet	*Feet.*		
35	Gray sand Contains a small quantity of particles of lignite. At 170 feet the sand is of a brownish color; thence the color grows darker with the descent. No apparent change in texture.	168.0	5.3	100	60
36	Brown lignite	173.3	2.7	.....	.....
37	Brownish gray clay Stiff and greasy, and contains some lignite.	176.0	1.9	>3,000	.....
38	Black lignite At 178 feet clayey, but of a very dark color.	177.9	2.1	.....	.....
39	Dark gray clay Containing some lignite. The quantity of lignite decreases with the descent to 185 feet; thence to 193.7 feet the quantity of lignite is not noticeable. The color of the clay (dark gray) remains the same. At 192 feet some sandy clay. When dry, clay is of a lighter color.	180.0	13.7	>3 000	.....
40	Lignite The upper part of this layer is black and free from clay. At 194 feet it is lignite and clay. A specimen is preserved from 195.4 feet which shows the gradual change from lignite to clay.	193.7	1.7	.....	.....
41	Dark clay and some lignite The quantity of lignite decreases with the descent.	195.4	0.6	.....	.....
42	Gray sand The upper part of this layer is of a brown color. The color grows lighter with the descent to 197.5 feet, where it is gray sand. From 197.5 feet no change noticed. Boring ended at 200 feet.	196.0	.....	.....	.....

Respectfully submitted,

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BORING No. 10.

Were landed on Craighead's Point from Fulton April 17, and left April 26. The 3-inch pipe was sunk to depth of 149 feet—the last 20 feet, with great difficulty, by the combined power of two mauls; one on ground and one on second platform. The nineteenth length was broken off when the small pipe was at 186.4 feet. The rapid and constant rise of material was unequalled in our experience, a great number of from between 8 and 20 feet, and one, when pipe was at 190 feet, of 35 feet. The boring reached a depth of 194 feet. Here the constantly rising material could not be pumped out and the pipe rebounded one-eight of an inch at every blow with but little downward progress. Had the pipe been strong enough to have stood the blows of two mauls (as in sinking 3-inch pipe) this friction could have been overcome, but as the power of one had been sufficient to break threads repeatedly, the experiment was not attempted. Rope was used with pumps instead of rods, to pump out risen material.

No.	Apparently before drying.	Location of layer.		Diameter to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Sandy loam Some roots and decayed wood, changing to sand gradually.	0.0	0.8	800	300
2	Sand	0.8	0.8	250	100
3	Dark tough clay Some clay of a reddish-brown color is distributed through this layer to 2.6 feet, whence dark clay only occurs.	1.6	1.4	1,000	306
4	Brown muck or vegetable mold Crumbles readily. The change to the next layer is abrupt.	3.0	0.2	1,000	400
	Sand At 5.8 feet the sand is similar in texture but darker.	3.2	4.3	800	300

No.	Apparently before drying.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
6	Dark clay (soft)	7.5	0.5	<3,000	1,000
7	Dark clay (soft)	8.0	1.8	1,000	200
	Growing darker and softer with the descent.				
8	Fine sand	9.8	2.7	300	125
	Coarseness increasing to 11.8 feet, thence no change.				
9	Sandy clay	12.5	5.0	800	200
	Fineness of texture increasing. At 13 feet clay is finer and shows streaks of clay of a reddish-brown color. At 15 feet clay is coarser, almost a quicksand.				
10	Fine quicksand	17.5	6.8	600	100
11	Dark-gray clay	24.3	0.7	1,000	300
	Containing some clay of a brownish-red color.				
12	Very tough blue clay	25.0	1.3	<3,000	.....
	Not hard, and blending with some clay of a brownish-red color.				
13	Quicksand	26.3	4.7	100	50
	Growing darker and coarser with the descent.				
14	Brown clay	31.0	0.4	<2,000	.....
	Coarseness increasing with descent.				
15	Quicksand	31.4	2.4	100	30
16	Tough bluish clay	33.8	0.5	<3,000	.....
17	Dark quicksand	34.3	2.7	80	50
	Coarseness increasing.				
18	Bluish clay	37.0	0.4	<3,000	.....
19	Dark quicksand	37.4	2.6	100	60
20	Bluish clay	40.0	0.8	<3,000	.....
21	Very dark quicksand	40.8	3.2	150	50
22	Bluish clay	44.0	2.5	<3,000	.....
23	Dark quicksand	46.5	2.8	125	60
	Particles uniform in size.				
24	Light bluish clay	49.3	0.5	<3,000	.....
25	Dark quicksand	49.8	2.2	125	40
	Great lack of uniformity in size of particles.				
26	Dark clay	52.0	0.4	<3,000	150
	This clay contained three nodules or lumps of very hard, light-colored clay of fine texture. Largest nodule 2¼ by 1¾ by ⅞ inches. On the application of nitric acid the effervescence was slight. Sample contains one lump.				
27	Dark sand	52.4	3.2	60	30
	Coarseness increasing with the descent.				
28	Gravel, 20 per cent	55 6	3.6	5	1¾″
	Sand, 80 per cent	.....	.....	50	20
	Largest, 1¾ by ¾ by ½ inch, preserved. Largest gravel stone is of fine texture, smooth, and of a greenish color.				
29	Coarse sand, with a small quantity of gravel	59.2	8.3	60	20
30	Sand, 10 per cent	67.5	21.2	50	20
	Gravel, 90 per cent	.....	.....	8	1⅝″
	The proportion of gravel increases with the depth to 77.6 feet. Below this there is no apparent change. At 80 feet a few pieces of lignite, quite hard; at 83.2 feet, lumps of lignite, smooth, and plainly showing that their smooth surface was caused by the wearing action of water; also, a piece of cottonwood (2¼ by 1¾ by 1½ inches) partially decayed. Below this the sand contained small particles of lignite; at 88.6 feet, a piece of lignite fractured by the gravel pump, dimensions, >2¼ by 2¼ by 1¼ inches—preserved.				
31	Gravel, 95 per cent	88.7	9.0	4	2″
	Sand, 5 per cent	.....	.....	30	20
	The upper part of this layer is sand; the coarseness increased uniformly with the descent; the gravel contains several curiosities, fossils; largest gravel stone (2 by 1⅛ by ⅞ inch) and another is preserved; also, a piece of lignite (2¾ by 1½ by 1¼ inches) from 91 feet, rounded at the edges from the wearing action of water.				
32	Dark clay	97.7	0.05	<3,000	.....
	The gravel and sand adhering to the clay is from the adjacent stratum.				
33	Sand, 80 per cent	97.75	15.25	60	20
	Gravel, 20 per cent	.....	.....	9	1.7″
	The upper part of this layer is fine sand. The coarseness increases rapidly with the descent to 99 feet; at 99 feet it is coarse sand and gravel; at 99.3 feet (three specimens preserved) several hard, light-colored stones of fine texture; their surfaces show the impressions of sand and gravel. Nitric acid applied to the surface caused effervescence, but when applied to a fracture the action was scarcely noticeable. Largest, 1.7 by 1.3 by .4 inches.				

No.	Apparently before drying.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
34	Dark sand	113.0	23.6	80	20
34 A.	A layer of rounded lumps and particles of lignite	124.2	0.1	.....	.....
	The sand under this lignite is similar to that above; at 127.2 feet a lump or nodule (preserved) of hard, light-colored clay, encircled by a belt of dark clay containing some sand and gravel; at 136 feet two gravel stones (preserved) and fine sand containing some particles of lignite. One of the stones (2 by 2 by $\frac{3}{8}$ inches) had a glossy appearance and smooth surface, with some cavities; the other ($1\frac{1}{4}$ by $1\frac{1}{8}$ by $\frac{1}{2}$ inch) looked like a lump of clay. Acid applied to this one caused effervescence.				
35	A layer consisting of lumps and particles of lignite	136.6	1.8	.....	.....
36	Dark sand, 60 per cent	138.4	0.7	80	20
	Gravel, 40 per cent	.....	.....	9	$1\frac{3}{8}''$
	Two of the largest gravel stones are preserved. One of them ($1\frac{1}{10}$ by $1\frac{1}{10}$ by $\frac{3}{4}$ inch), of a light color, contains a fossil; the other ($1\frac{3}{8}$ by 1 by $\frac{1}{2}$ inch) is of a siliceous character.				
37	Dark sand	139.1	3.2	80	20
	Contains particles of lignite.				
38	Sand, 60 per cent	142.3	27.7	40	20
	Gravel, 40 per cent	.....	.....	6	$2\frac{1}{8}''$
	Contains a piece of petrified wood, preserved. The largest three gravel stones, and two other ones, containing fossils, from 155 feet, are preserved.				
39	Sand	170.0	18.4	80	20
	Toward the bottom of this layer the sand was some darker.				
40	Dark sand	188.4	5.7	100	20
	A very few particles of gravel, largest $\frac{1}{2}$ by $\frac{7}{16}$ by $\frac{1}{8}$ inch. This sand continued as far as the boring was made (194.1 feet). A few particles of black, decayed woody material were noticed in the top of the last few pumpfuls. This material being lighter than the sand, had risen to the surface of the water in the pipe, and was the first to be taken up by the pump.				

No local fossils or shell remains were recognized in boring. The only possible local growths are the possible concretions mentioned in sample No. 26 as clay nodules, whose presence in clay beds seem otherwise unaccountable.

Respectfully submitted.

E. H. WILSON,
Assistant, in charge.

Maj. CHARLES R. SUTER,
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BORING No. 11.

Arrived at point of location of boring No. 11, 3 miles south of Johnson's Landing, Tenn., by wagon, and pitched camp in a dense cane-brake, at an elevation of 12 feet beneath river bank. A well was dug through clay to a depth of 9 feet to obtain water. A striking example of the want of continuity in clay beds was disclosed at the boring, 100 feet from the well, where clay layer was but 1.3 feet in thickness. The appearance of 27 B when brought to surface, in many fragments, suggested that it had existed as a layer, and the fresh lignite attached renders it probable that it directly overlaid lignite found at 151 feet. It is located somewhat differently on account of the interposition of gravel in pump which (having been sunk ahead of pipe), after securing conglomerate, might have caught "caving in gravel" between lignite and conglomerate while churning. A noticeable feature is sand decreasing in coarseness in descending—samples Nos. 30 and 32. No unusual mechanical difficulties were experienced in the boring, which was remarkably free from accidents. Large pipe sunk by twisting to 151 feet. Pumped ahead through lignite and clay to 169 feet, when 2-inch pipe was introduced and mauled to 194 feet, whence boring was finished without sheathing. At 207.6 feet the soft material constantly filled the hole and the boring was pronounced finished.

No.	Apparently before drying.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Dark clay Containing some of a brownish-red color. At 1.3 feet the clay is drier and more sandy.	0.0	1.4	2,000	1,000
2	Light-brown sand Contains a few particles of lignite.	1.4	0.2	150	60
3	Dark clay Containing some decayed wood. The coarser sand adhering to the clay is from adjacent layer.	1.6	0.3	<3,000	.....
4	Light-brown sand Consists of hard lumps when dry.	1.9	0.1	400	80
5	Brownish clayey sand	2.0	0.5	700	200
6	Light-brownish sand Coarseness increasing to 3.4 feet, where there is some clayey sand; thence it is sand again.	2.5	2.4	100	50
7	Bluish and brownish red clay Very tough and containing some cane-root and occasionally some decayed wood. From 6 feet to 13.6 feet it is bluish and brownish clay. A few whitish nodules were noticed. They are hard, and effervesced when nitric acid was applied.	4.9	8.7	<3,000	.....
8	Quicksand Color, light brown, changing to a very dark gray. The coarseness increases slightly with the descent. Consists of hard lumps when dry.	13.6	4.0	100	40
9	Dark-gray and some reddish-brown clay	17.6	1.0	2,500	.....
10	Dark quicksand; hard when dry	18.6	0.4	100	40
11	Bluish and reddish-brown clay The upper part of this layer is sandy clay. It soon changes to clay. Thin layers ($\frac{1}{4}$ inch thick) of sandy clay occur frequently. From 22.2 feet hence it is sandy clay.	19.0	3.8	2,000	1,000
12	Light-brown quicksand Hard when dry. Contains a few particles of gravel. The upper part of this layer is fine sand; coarseness increases with descent. At 29 feet some decayed wood. Sand contains some lignitic particles. At 36.3 feet five pieces of lignite (drift) of very fine texture, preserved.	22.8	13.6	80	>20
13	Light-brown sand, 85 per cent	36.4	1.1	80	20
	Gravel, 15 per cent The sample contains the largest pebble, $\frac{7}{8}$ by $\frac{3}{4}$ by $\frac{1}{2}$ inch. At 36.4 feet the quantity of gravel is very small, but it increases with the depth.	.....	.....	15	$\frac{7}{8}$″
14	Dark-blue clay Very tough. Under the clay is very fine sand.	37.5	0.2	<3,000	.....
15	Dark-gray sand Containing some lignitic particles and a small quantity of gravel. The upper part of this layer is very fine sand, but the coarseness increases. Four pebbles are preserved, two from 38 feet and two from 39 feet.	37.7	9.1	100	>20
16	Very dark sand, 95 per cent	46.8	3.0	125	20
	Gravel 5 per cent Contains a small quantity of lignitic particles. A pebble, the largest, $1\frac{3}{4}$ by $\frac{5}{8}$ by $\frac{1}{2}$ inch, from 47 feet, preserved.	.....	.....	16	$1\frac{3}{4}$″
17	Blue clay, pasty; color is lighter when dry	49.8	0.2	2,000	400
18	Dark-gray sand, 30 per cent	50.0	17.4	60	20
	Gravel, 70 per cent From 50 feet to 54.8 feet it is 80 per cent. of dark-gray sand and 20 per cent. of gravel. From 50 feet to 54.8 feet the gravel increases in coarseness but not in quantity. From 54.8 feet to 67.4 feet it is 20 per cent. gray sand and 80 per cent. gravel.	.....	.....	8	1″
19	Dark-gray sand Contains small particles of lignite. A pebble found at 76 feet ($1\frac{3}{8}$ by 1 by $\frac{1}{2}$ inch) is preserved.	67.4	9.7	60	20
20	Dark sand, growing coarser Contains two small pebbles (largest one $\frac{1}{2}$ by $\frac{3}{8}$ by $\frac{3}{8}$ inch), which are preserved in sample; also a few particles of gravel and lignite.	77.1	1.2	100	>20
21	Dark-grayish sand, 85 per cent	78.3	3.8	70	20
	Gravel, 15 per cent At 78.3 feet the quantity of gravel is very small; coarseness increases with descent to 81.2 feet; thence it is 80 per cent. gravel and 20 per cent. sand. No pebbles occur from 78.3 feet to 81.2 feet. Contains particles of lignite.	.....	.....	12	4
22	Grayish sandy clay Containing gravel; cannot tell whether or no it is a layer. From the relative position of this clay in pump it seems that, if a layer, it separates the sand and gravel above from the fine sand below.	82.1	0.025	.....	.....

No.	Apparently before drying.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
23	Dark sand. Containing a few pebbles and small particles of lignite. The largest pebble (2¼ by 1½ by 1 inches) was found at 85 feet. Two others were found, and all of them preserved.	82.125	7.875	150	20
24	Gray sand, 65 per cent	90.0	40.0	50	20
	Gravel, 35 per cent	.....	.....	6	2¼″
	Contains particles of lignite, and rounded lumps occur frequently, two of which are preserved. The largest pebble is from 95 feet (2¼ by 1¾ by ¾ inches). At 90 feet this layer is sand with very little gravel. The quantity of gravel increases with the depth to 105 feet. At 105 feet it is 90 per cent. gravel and 10 per cent. sand. The quantity of gravel decreases from 105 feet to 120 feet, where there is no gravel.				
24 A.	From 109 feet to 125 feet, several pebbles are preserved, some of which contain fossils.				
24 B.	Some light-brown and some brownish clay, all of it preserved.	115.0	.....	.....	.....
	The sand above and below this clay is similar in color and texture. At 120 feet the sand is similar in color and texture to that at 90 feet. From 120 feet the coarseness increases with the descent to 130 feet. This layer is noticeable for the lack of uniformity in texture and the great number of large gravel stones.				
25	Gray sand, 50 per cent	130.0	11.0	50	20
	Gravel, 50 per cent	.....	.....	4	2¾
	Contains particles and rounded lumps of lignite and many large pebbles. Largest pebble (2¾ by 1¾ by 1¼ inches) was found at 134 feet.				
25 A.	At 135 feet several lumps of dark-gray clay	135.0	.....	.....	.....
	Containing sand and gravel; thence less large gravel and more lumps of lignite occur.				
25 B.	At 140 feet, some dark-gray clay, containing sand and gravel.	140.0	.....	.....	.....
	Two pieces of soapstone. One piece preserved.				
26	Grayish sand	141.0	8.2	60	>720
	A few pebbles were found in this layer. Two are preserved; the largest one is 2⅛ by 1¾ by ½ inches. Contains particles of lignite.				
27	Gray sand, 35 per cent	149.2	1.8	70	20
	Gravel, 65 per cent	.....	.....	3	2½″
	Largest gravel stone is 2½ by 1⅞ by 1½ inches. This layer is noticeable for the great number of large gravel.				
27 A.	Some brownish clay	150.0	.....	.....	.....
27 B.	Sand conglomerate	150.7	.....	.....	.....
	Containing metallic particles, to which lignite is attached; cementing material is iron.				
28	Black lignite	151.0	4.0	.....	.....
	The sand found in sample is from the layer of sand and gravel above. The 3-inch pipe was sunk to 151 feet and some sand oozed in at the bottom of pipe. At 154 feet the lignite contains some light-brown clay.				
29	Grayish clay	155.0	10.0	2,000	1,000
	Contains some lignite. The upper part of this layer is of a brownish color. The sample is from 157 feet, and shows the way in which the lignite is distributed. The clay feels greasy. From 160 feet thence the clay increases in coarseness with the descent.				
30	Gray sand	165.0	11.9	200	100
	The fineness of texture increases with the descent.				
31	Dark-gray clay; gray when dry	176.9	0.4	1,500	1,000
32	Dark-gray sand	177.3	14.7	150	80
	Light gray when dry. Fineness of texture increases with the descent. Average number of diameters to an inch at 178 feet is 150; at 190 feet it is 300.				
33	Gray clay, which is stiff	192.0	11.0	1,500	800
33 A.	Brownish clay, which is very pasty	.....	.....	200	80
	The clay varies greatly in consistency; is evidently made up of several layers. The difference of color of Nos. 33 and 33 A is due to the absorption of water, holding lignite in suspension, by the coarser material of layers. As every pumpful contained both gray and brownish clay, the place where one ended and the other began could not be located.				
33 B.	Brownish clay, containing some lignite	192.0	0.2	.....	.....
33 C.	Black lignite, equal in quantity to a layer ½ inch thick	192.2	.....	.....	.....
33 D.	Pieces of decayed wood occurring from 198 feet to 200 feet	.....	.....	.....	.....

No.	Apparently before drying.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
34	Dark clay, which is stiff	203.0	.....	<3,000	
34 A.	Dark clay, which is pasty	.....	.....	400	100
	These two kinds of clay occurred as in Nos. 33 and 33 A, except that, at one time, two successive pumpfuls did not contain any of 34 A. At 207.6 feet the pasty clay is of a lighter color; here the hole filled in so fast that the boring was declared finished.				

Respectfully submitted.

E. H. WILSON,
Assistant, in charge.

Maj. CHARLES R. SUTER,
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BORING No. 12.

Arrived at boring No. 12, Tuesday, April 22, 1879, at 7 o'clock a. m., and were ready to leave Thursday, April 24, 1879, at 10 a. m.

This is one of the "shallow borings" of this reach, which are commenced because there is only pipe enough for party No. 2 to make deep borings.

A depth of 96.7 feet was considered sufficient, and the boring accordingly stopped at that point.

Work on this boring was quite rapid and remarkably free from accidents.

The bayou on whose bank this is situated is made memorable by an attempt made during the late war to pass Fort Pillow by turning the river through it.

The shells in clay bed at 34 inches (No. 10) are probably a local lacustrine deposit.

No.	Apparently before drying.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Surface soil	0.0	1.8	<2,000	1,000
2	Sandy loam	1.8	8.2	2,000	500
3	Sandy clay, with rusty streaks	10.0	6.5	1,500	1,000
4	Blue clay, with brown streaks	16.5	5.9	<3,009	<3,000
5	Brown sandy clay	22.4	0.8	<3,000	<2,000
6	Blue sandy clay	23.2	1.8	1,500	500
7	Clear blue clay	25.0	4.6	<3,000	<3,000
8	Fine sand	29.6	0.2	125	75
	Contains a great percentage of very fine material, and appears like a mixture of sand and clay.				
9	Blue clay	29.8	4.2	<3,000	<3,000
10	Blue clay, darker	34.0	6.1	<3,000	<3,000
	Discloses, under the glass, a number of fragmentary remains of shells.				
11	Blue clay, finer	40.1	3.7	<3.000	<3.000
12	Blue clay, bottom of stratum	43.8	0.2	<3,000	<3,000
13	Very fine quicksand	44.0	24.4	100	40
	Contains very fine material, much the same as No. 8.				
14	Gravel, 20 per cent	68.4	1.4	$\frac{5}{8}$″	$\frac{7}{8}$″
	Sand, 80 per cent	.....	.....	30	20
15	Sand	69.8	9.4	40	>20
16	Gravel, 25 per cent	79.2	8.8	3	1
	Sand, 35 per cent	.....	.....	25	20
	Lignite, 10 per cent	.....	.....	.....	.....
	Clay, 30 per cent	.....	.....	.....	.....
	Presents a stratum, nearly 9 feet thick, of sand, containing gravel, lignite, and balls of clay, with no definite arrangement perceptible, but seeming to be scattered as nodules throughout.				
17	Quicksand	88.0	1.8	80	>20
18	Gravel, 60 per cent	89.8	6.9	2	<20
	Sand, 40 per cent	.....	.....	100	20
	All the samples contain particles less than $\frac{1}{3000}$ of an inch in diameter.				

Respectfully submitted.

E. H. WILSON,
Assistant, in charge.

Maj. CHARLES R. SUTER,
Corps of Engineers, U. S. A.

BORING No. 13.

Arrived at Elmot Landing, Ark., Saturday, May 24, at 9 p. m. Pitched camp on main bank, and left boring equipment on towhead on opposite side of channel. Raised derrick and began boring Monday, 26th, and completed the boring at 2.30 p. m. June 4. No unusual difficulties were encountered. The new pumps, 5½ feet long, were used. They are particularly useful in pumping out rises, saving much time. When material rises slowly, the capacity of shorter pumps used with the utmost speed is often barely sufficient to raise material at the rate at which it rises. Here the longer pumps are of the greatest service. It is to be regretted that the crookedness of the small pipe will not permit the use of the long pumps through them. The 3-inch pipe was sunk by twisting to 168 feet. Continued use of large pumps to 203.8 feet, when unsheathed hole filled in so fast that pumping was very heavy. Lowered 2-inch pipe by twisting to 207 feet, and by pumping ahead mauled it without much weight of blow to 213 feet. Pumped ahead to 225 feet. Additional depth could have been made by sheathing, but the supply of 2-inch pipe was exhausted. The strength of wire rope, the resistance to drawing small pipe (endangering the loss of lower lengths), and the capacity to hold rods of smoke stack only prevent the continuance of borings to greater depth in this material; though the weight of rods would necessitate some more powerful way of handling. No shell remains suggested that we had passed through the Tertiary strata, though the increased depth was made in hopes that we might so do.

No.	Apparently before drying.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Brownish sand, containing some willow roots	0.0	1.0	400	200
2	Dry grayish sand; contains some roots	1.0	3.8	350	100
3	Brownish clay; contains some roots	4.8	0.6	2,000	500
4	Light-brownish sand; contains particles of lignite	5.4	24.6	150	100
5	Light-brown sand; contains particles of lignite	30.0	6.7	175	80
6	Dark quicksand; contains particles of lignite	36.7	5.3	300	100
7	Dark sand; color is lighter when dry	42.0	6.3	100	30
	Contains particles of lignite; coarseness increasing with the descent.				
8	Gray sand, 95 per cent	48.3	5.8	150	20
	Gravel, 5 per cent	.....	.....	15	4
	Contains particles of lignite.				
8 A.	Some wood, bark, and lignite	53.0	.....	.....	.....
9	Dark-gray sand; color is lighter when dry	54.1	11.7	60	>20
	Contains particles and rounded lumps of lignite. At 58 feet some wood and lignite occur. The sand increases in coarseness with the descent. At 61 feet there is some gravel. At 63 feet it is 10 per cent. gravel and 90 per cent. sand. Largest gravel (1⅛ by ¾ by ⅜ inches) is preserved.				
9 A.	Lumps of lignite from 65 feet	65.0	.....	.....	.....
10	Gray sand, 10 per cent	65.8	1.0	60	20
	Gravel, 90 per cent	.....	.....	10	2¼″
	Largest gravel (2¼ by 1⅜ by ¾ inches) is preserved. Contains particles and lumps of lignite, and several large gravel, some of them preserved.				
10 A.	Pebbles containing fossils	66.0	.....	.....	.....
11	Gray clay; very fine sand underneath	66.8	0.05	1,000	500
	The sample contains sand belonging to adjacent layers.				
12	Dark sand, 95 per cent	66.85	3.15	100	20
	Coarse gravel, 5 per cent	.....	.....	¾″	1⅞″
	Contains particles of lignite. The upper part of this layer is very fine sand. Largest gravel (1⅞ by 1⅝ by 1⅛ inches) is preserved.				
13	Dark gray sand, 50 per cent	70.0	11.4	80	20
	Gravel, 50 per cent	.....	.....	10	2½″
	The coarseness increases with the descent. Largest gravel (2½ by 1¾ by ⅞ inches) from 71 feet. At 70 feet it is 80 per cent. sand and 20 per cent. gravel. At 76.5 feet it is 90 per cent. gravel and 10 per cent. sand. Sample is from 71 feet. Several large gravel are preserved.				
13 A.	Gray clay, equal in quantity to a layer ½ inch thick	77.0	.....	.....	.....
	Cannot tell whether or no it is a layer, as sample came in two pumpfuls, while the sand was rising.				
13 B.	Pebbles, containing fossils from 78 feet.				
14	Dark sand; gray when dry; contains particles of lignite	81.4	4 0	80	20
15	Dark clay; fine sand underneath	85.4	0.1	1,000	300
	Sample contains sand from adjacent layers.				
16	Dark sand	85.5	6.0	70	20
	Contains a few large gravel and particles of lignite. Largest gravel (1¾ by 1 by ⅜ inches) preserved. Several gravel stones of this layer are preserved.				

No.	Apparently before drying.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Greatest.	Greatest.
16 A.	Pebbles containing fossils from 88.4 feet to 89 feet.	*Feet.*	*Feet.*		
17	Grayish sand, 80 per cent	91.5	25.5	70	20
	Gravel, 20 per cent	.....	.....	10	$2\frac{1}{4}$"
	The sand increases in coarseness with the descent. Contains particles of lignite. Largest pebble ($2\frac{1}{4}$ by $1\frac{1}{4}$ by $1\frac{1}{4}$ inches) is preserved.				
17 A.	Pebbles preserved that contain fossils, from 93 feet to 117 feet.				
18	Sand, 25 per cent	117.0	13.0	50	20
	Gravel, 75 per cent	.....	.....	3	$3\frac{1}{4}$"
	Contains particles of lignite. Largest pebble >$2\frac{3}{8}$ by $2\frac{3}{8}$ by $1\frac{3}{8}$ inches. Several pebbles preserved.				
18 A.	Pebbles preserved that contain fossils, from 120 to 130 feet. At 120 feet a large gravel stone was found, and at 129 feet another. Both were broken by pipe and pump so that it was impossible to obtain their dimensions; fragments are preserved. At 128 feet, a conglomerate composed of sand and gravel. It was fractured by pump. Several fragments are preserved.				
19	Gray sand, 95 per cent	130.0	9.4	70	20
	Coarse gravel, 5 per cent	.....	.....	$\frac{5}{8}$"	$2\frac{3}{8}$"
	Contains particles of lignite and many granite pebbles. Largest pebble ($2\frac{3}{8}$ by $1\frac{5}{8}$ by $1\frac{3}{8}$ inches) and several others preserved.				
19 A	Pebbles preserved that contain fossils from 130 feet to 139.4 feet.				
20	Sand, 60 per cent	139.4	9.8	80	20
	Gravel, 40 per cent	.....	.....	2	$2\frac{1}{4}$"
	Contains many granite pebbles. Sample is from 140 feet. From 139.4 feet to 142 feet it is 80 per cent. sand and 20 per cent. gravel. From 142 feet to 149.2 feet it is 50 per cent. sand and 50 per cent. gravel.				
20 A	Pebbles preserved, many of them containing fossils, from 139.4 feet to 149.2.				
21	Sand, 20 per cent	149.2	3.8	80	20
	Gravel, 80 per cent	.....	.....	4	$2\frac{1}{2}$"
	Contains many granite pebbles. Largest pebble ($2\frac{1}{2}$ by 1 by 1 inch) preserved.				
21 A	Pebbles preserved, many of them containing fossils, from 149.2 to 153 feet.				
22	Sand, 50 per cent	153.0	7.0	40	20
	Gravel, 50 per cent	.....	.....	6	>$2\frac{7}{8}$"
	The sample is from 154 feet, where it is 60 per cent. sand and 40 per cent. gravel. The coarseness of the sand and gravel increases to 155, where it is 95 per cent. gravel and 5 per cent. sand; thence the coarseness of the sand and gravel decreases with the descent. Largest pebble (>$2\frac{7}{8}$ by $2\frac{1}{4}$ by $1\frac{1}{4}$ inches) and several others are preserved.				
22 A	Pebbles preserved, many of them containing fossils, from 153 feet to 160 feet.				
23	Sand, 90 per cent	160.0	0.4	50	20
	Gravel, 10 per cent	.....	.....	15	4
24	Dark, stiff clay	160.4	13.7	3,000	.....
	The sample is from 164.5 feet. It grows darker with the descent, to 166 feet; thence lighter to 170 feet (where it is dark-gray clay); thence darker. This layer is sandy clay to 163 feet; thence it is of fine texture to 176 feet; thence it is sandy clay. Very pasty clay was found in every pumpful while pumping through this layer. The pasty clay was in excess at 168 feet, 171.7 feet, and 173 feet. Its color is the same as that of the stiff clay with which it occurred.				
24 A	Pasty clay from 171.7 feet	.....	.....	800	>20
	The great inequality in size of particles is noticeable.				
25	Black lignite	174.1	5.9	.....	.....
	It becomes harder and more compact as the depth increases. The upper part of this layer is brown; color gradually changes to black on descending. The sample contains some sand from layers above, as the pump was worked in lignite, ahead of pipe.				
26	Light-brown clay	180.0	3.4	<3,000	.....
	At 180 feet, it is about 50 per cent. of lignite and 50 per cent. clay. The quantity of lignite decreases with the depth to 181 feet, where there is very little lignite. Sample is from 181.6 feet. At 182 feet, the clay is sandy; thence the coarseness increases with the descent.				

No.	Apparently before drying.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
27	Dark-gray clay. Contains a small quantity of lignite, occurring in streaks and lumps. This lay consists of a succession of thin layers (varying from $\frac{1}{8}$ of an inch to 1 inch thick) of clay, intercepted by whitish sandy streaks. From 195 feet to 198 feet the clay is of fine texture, but there is no change in structure; thence the coarseness increases with the descent. From 202 feet the color is lighter. Every pumpful contained pasty clay.	183.4	20.4	3,000	300
28	Very pasty, dark-gray clay. Lumpy and gray when dry, and looks like very fine sand. Coarseness increases to 207 feet; thence coarseness decreases and it becomes darker with the descent. No stiff clay was found while pumping through this layer.	203.8	9.2	300	150
29	Light-brown clay, containing lignite	213.0	2.0	<3,000	.....
29 A.	At 213.4 feet, some black lignite was found, quantity equal to a layer 1 inch thick. It is probably a layer. From 213.5 feet to 215 feet, the quantity of lignite in clay decreases.	213.4	0.1	.....	.....
30	Stiff, dark-gray clay. Gray when dry. From 215 feet to 220 feet contains some lignite. This clay grows coarser and lighter in color with the descent to 120 feet; thence it is of fine texture. Every pumpful contained some pasty clay of the same color as stiff clay. The pasty clay is not as coarse as that found in layers above.	215.0	.....	2,000	1,000
30 A.	Pasty clay from 225 feet	225.0	.....	500	100
30 B.	Dark-gray clay. Stiff, from 225 feet. Boring ended at 225 feet.	225.0	.....	<3,000	.....

Respectfully submitted.

E. H. WILSON,
Assistant, in charge.

Maj. CHARLES R. SUTER,
Corps of Engineers, U. S. A.

BORING NO. 14.

Arrived at boring No. 14, from Bullerton Towhead, by steamer Osceola Belle, on Saturday, April 26, 1879, and left on Monday, April 29, at 12.30 p. m.

This boring is remarkable for the number of strata which it exposes, no two of which, when fresh, appeared to be alike. At 97.6 feet, the greatest depth reached, the shoe of the pipe rested upon a cottonwood log, pieces of which are shown in sample 31.

No difficulties were encountered, and the boring was nearly entirely made without the use of the maul.

No.	Notes and analysis.	Location of of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Sandy loam	0.0	6.4	1,500	50
2	Sandy clay and mud. Since drying appears to be pure clay.	6.4	1.4	2,000	200
3	Light blue clay with rusty streaks	7.8	4.5	2,000	750
4	Clear blue clay,	12.3	5.1	<3,000	.....
5	Fine sand. This contains a large amount of fine material which gives it a clayey consistency when dry.	17.4	0.2	100	50
6	Quite coarse blue clay, and quite soft. Grows softer as it descends; graduates into liquid clay, and finally into fine sand, at 21.6 feet.	17.6	4.0	<3,000	.....

No.	Notes and analysis.	Locality of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
7	Fine sand So very nearly clay that it is hard to say to which class it belongs.	21.6	2.8	1,000	100
8	Blue clay	24.4	0.05	<3,000	.....
9	Fine quicksand	24.45	1.95	120	50
10	Dark-blue clay, with indigo streaks	26.4	0.5	<3,000	.....
11	Fine blue quicksand	26.9	1.5	300	100
12	Blue clay	28.4	1.8	<3,000	.....
13	Quicksand; very uniform in size of particles	30.2	4.6	100	50
14	Blue clay	34.8	0.1	<3,000	.....
15	Quicksand With a very little lignite-washings; found to be very uniform in size of grains.	34.9	6.5	200	75
16	Fine sand and mold	41.4	1.2	150	50
17	Sandy mud Drift and bark. This sample, although very fine and liquid, would not rise in the pipe.	42.6	1.6	300	75
18	Blue clay	44.2	0.5	<3,000	1,000
19	Coarse sand When fresh looked as though it were mixed with coal ashes, probably on account of the large amount of fine material it contains.	44.7	1.3	80	20
20	Sand, 83 per cent	46.0	6.5	40	20
	Gravel, 17 per cent	.....	.....	10	¾″
	Percentage of gravel increases with descent to 40 per cent. at 48 feet; contains a little lignite.				
21	Sand This is mixed with finely divided lignite, and contains some lumps, consisting of sand held together by lignite in a finely powdered condition.	52.5	0.05	50	>20
22	Coarse sand	52.55	5.55	40	>20
23	Sand, 85 per cent	58.1	1.9	30	20
	Gravel, 15 per cent	.....	.....	7	1″
	This sand is very coarse and contains little fine material.				
24	Coarse sand	60.0	12.5	75	>20
25	Sand, 75 per cent	72.5	8.3	50	20
	Gravel, 25 per cent	.....	.....	8	1″
26	Hard blue clay	80.8	3.7	<3,000	.....
27	Quicksand	84.5	0.3	50	20
28	Blue clay	84.8	0.7	<3,000	.....
29	Sand and mud, 90 per cent	85.5 88.0	0.5 9.6	75	20
	Gravel, 10 per cent	.....	.....	8	¾″
	Amount of fine material in this sample is considerable.				
30	Sand Coarse and dirty, containing small lumps of clay, and graduating in 2 feet into same material as No. 29.	86.0	2.0	30	>20
31	Cottonwood log Pipe rested upon this at completion of boring.	97.6	.....	.....	.....

Respectfully submitted.

E. H. WILSON,
Assistant, in charge.

Maj. CHARLES R. SUTER,
Corps of Engineers, U. S. A.

BORING No. 15.

Arrived at boring 15, by skiff, from boring 28, on Tuesday, May 13, 1879, at 12 m., and were ready to leave on Thursday, May 15, 1879, at 9 a. m.

Work on this boring was interrupted on the 13th instant, at 2 p. m., by rain, which continued for the rest of the day. This boring shows more sand and less clay and gravel than any of its predecessors, notwithstanding which it required more labor than others of less favorable material. The ground in which it is sunk appeared to be a comparatively old formation.

No.	Notes and analysis.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Fine sandy soil	0.0	4.0	125	90
2	Hard brown clay, containing roots of trees	4.0	4.5	<3,000	.....
3	Fine sand, sandy clay more properly	8.5	14.9	<3,000	300
4	Gravel, 8 per cent	23.4	16.4	10	2″
	Coarse sand, 92 per cent	.....	.....	50	20
5	Blue sand, with bits of lignite, wood, and bark	39.8	8.7	75	>20
6	Sand, 80 per cent	48.5	24.5	30	20
	Gravel, 20 per cent	.....	.....	12	1
	Graduating to 75 per cent. Gravel (same size) at 60.0 and back to 25 per cent. Gravel at 63.0.				
7	Sand	73.0	10.2	40	>20
	Seems to be same as last sample, excepting that from 60 to 73 the gravel gradually disappeared. Pipe rested in sand at completion of boring.				

Respectfully submitted.

Maj. CHARLES R. SUTER, *Corps of Engineers, U. S. A.*

E. H. WILSON, *Assistant, in charge.*

BORING No. 16.

Arrived at this point Tuesday, April 29, 1879, at 6 o'clock p. m., by team, from Driver's Landing, and left on Thursday, May 1, at 12 m.

On Wednesday, April 30, work was suspended, at a depth of 64 feet, at 4 p. m., on account of a heavy shower of rain, and resumed next morning at 7 o'clock. At 10 a. m., May 1, when at a depth of 70.2 feet, the steamer Osceola Belle arrived to take the party to Island 30, and the boring was not pushed any farther, being then sufficiently deep. Nothing in connection with this boring worthy of note happened.

No.	Notes and analysis.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Surface soil, sandy loam	0.0	3.4	1,000	300
2	Coarse red clay	3.4	1.4	800	200
	Shows no red after drying, save some streaks and spots.				
3	Blue clay	4.8	18.7	1,000	200
4	Coarse sand	23.5	10.7	25	>20
	Contains a few bits of wood and gravel, amounting to, perhaps, 2½ per cent. Average 10 to an inch.				
5	Blue clay	34.2	6.0	>3,000	.....
6	Fine sand	40.2	1.8	250	50
	Contains some few lumps of lignite and gravel, average 15 to 1 inch.				
7	Blue clay	42.0	3.4	1,000	100
	Light-blue patches, distinguishing the light-gray patches prevailing after drying.				
8	Sandy blue clay	45.4	3.6	750	100
	Very coarse and soft when fresh.				
9	Coarse red clay	49.0	2.0	1,000	500
	Contains limy concretions; no shell remains distinguishable. Effervesces upon application of nitric acid.				
10	Fine quicksand	51.0	9.0	100	30
	Contains a few gravel and lumps of lignite.				
11	Gravel	51.0	8.0	.....	.....
	Found at intervals in No. 10 from 51 to 59 feet.				
12	Sand and lignite, 75 per cent	60.0	10.2	50	20
	Gravel, 25 per cent	.....	.....	7	2
	Graduates rapidly to 75 per cent. gravel. Average 3 to an inch, while the lignite disappears. Contains a large amount of fine material.				

Respectfully submitted.

E. H. WILSON, *Assistant, in charge.*

Maj. CHARLES R. SUTER, *Corps of Engineers, U. S. A.*

BORING No. 17.

Arrived at Island 27, by United States steamer Octavia, at 1.3 p. m. on Saturday, May 10, 1879, and left on Tuesday, May 13, 1879, by skiff, for boring 15, on river bank, one-half mile above Ashport, Tenn.

Only one incident of note is connected with boring 17. At 75 feet a cottonwood stick four-tenths of a foot thick was encountered, and passed through with a single pipe and without the use of the maul.

The ground in which the boring is situated appears to be of rather recent formation, as judged by the growth of timber.

No.	Notes and analysis.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Fine sand Sandy clay after drying.	0.0	14.0	1,500	200
2	Coarse blue clay Effervesces slightly with nitric acid, but shows no shell remains under the glass.	14.0	5.4	<3,000	.....
3	Fine blue sand	19.4	9.8	300	125
4	Coarse sand	29.2	2.8	75	<20
5	Fine quicksand	32.0	5.6	200	100
6	Blue clay Contains thin laminæ of sand; shows no shell remains under the glass; nitric acid causes effervescence; quite active in the sandy portion, but very slight, if any, in the substance of the clay proper.	37.6	1.2	<3,000	.....
7	Fine quicksand Before drying apparently the same as No. 5, but much finer after drying.	38.8	7.0	400	100
8	Coarse blue clay Same appearance as No. 6, and behaves in the same manner with nitric acid.	45.8	0.8	<3,000 200	 75
9	Fine sticky sand	46.6	7.6	.....	.....
10	Sand, 60 per cent Gravel, 40 per cent Very dirty when fresh, and sand very fine.	54.2	15.4	125 6	20 1
11	Clay A portion of clay which came up very much broken by the pump; white on one side and blue on the other; on account of churning of the pump, impossible to tell which color was uppermost; probably a stratum, as there is a marked difference between the gravel above and below it.	69.6	0.1	<3,000	.....
12	Sand, 55 per cent Gravel, 45 per cent Sand much coarser than that in No. 10.	69.7	5.3	30 5	20 1
13	Cottonwood stick to 75.4 feet followed by sand and gravel, same as in No. 12. Immediately below the cottonwood was found a little clay, which probably was adherent to it when it lodged in its position.	75.0	4.4	.....	.....
14	Fine quicksand The pipe rested in sand at the completion of this boring.	79.4	3.6	50	20

Respectfully submitted.

E. H. WILSON,
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Maj. CHARLES R. SUTER,
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BORING No. 18.

Arrived at boring 18, on Bullerton Towhead, from No. 12, on Thursday, April 24, 1879, at 2 p. m., and left Saturday, 26th, at 12 m.

This being a shallow boring was not pushed to a greater depth than 84.6 feet, and in consequence was not attended with any accidents or much consumption of time.

The result of the boring shows that the whole formation at that point, to the depth reached, is principally sand and gravel, no clay being found, as the term is used, and the soil itself being very sandy in character.

No.	Location of layers.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Surface soil Is very sandy to the touch.	0.0	5.4	3,000	1,000
2	Fine red sand Since drying this appears to be more of a clay than sand, although presenting the characteristics of sand when fresh. It could be called either a sandy clay or clayey sand.	5.4	10.6	1,000	150
3	Sand Growing coarser; with some lumps of clay.	16.0	13.0	150	75
3 A	Lumps of clay These are found at intervals, in the pumps, with material from No. 3. When dried they became so brittle that they could not be preserved entire.	16.0	7.0	.....	.....
4	Quicksand This contained some bits of bark and wood from 42 to 44 feet.	29.0	14.5	100	30
5	Sand, 80 per cent	43.5	6.5	100	20
	Gravel, 20 per cent The sand in this is composed very largely of transparent quartz.	.....	.....	4	>2″
6	Quicksand Consists mainly of transparent quartz crystals of very uniform size. Contains some bits of wood and lignite washings.	50.0	4.2	80	30
7	Sand, 85 per cent	54.2	2.2	160	20
	Gravel, 15 per cent The sand in this contains some bits of wood and lignite washings.	.....	.....	8	1½″
8	Fine sand Contains rather a large percentage of fine material.	56.4	2.6	125	>20
9	Sand, 80 per cent	59.0	12.5	30	20
	Gravel, 20 per cent	.....	.....	4	1½″
10	Fine sand This is very uniform in size of particles.	71.5	7.7	200	40
11	Sand, 75 per cent	79.2	4.4	80	20
	Gravel, 25 per cent The sand in this contains a large amount of very fine material.	.....	.....	6	¾″

Respectfully submitted.

E. H. WILSON,
Assistant, in charge.

Maj. CHARLES R. SUTER,
Corps of Engineers, U. S. A.

BORING No. 19.

Arrived at boring 19, by steamer Osceola Belle, from No. 28, on Saturday, May 17, 1879, at 9 p. m., and left on Tuesday, May 20, 1879, at 8 a. m., for boring 30. This boring is made on what appears to be a narrow strip of ground of recent formation. It extends along the river bank for quite a distance, although not more than 25 or 30 feet in width, after which the ground seems to be covered with timber of many years' growth.

In this boring the derrick was set up and the boring completed in one day.

The paucity of clay in this boring is noteworthy.

No.	Notes and analysis.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Fine sand. Very uniform in size of particles.	0.0	6.8	200	100
2	Brown, sandy clay	6.8	1.8	1,000	100
3	Fine sand	8.6	3.9	500	150
4	Blue clay	12.5	0.8	<3,000	.....
5	Fine, blue sand	13.3	7.9	500	100
6	Blue clay	21.2	0.2	<3,000	.....
	Sand, 20 per cent	21.4	6.6	40	20
	Gravel, 80 per cent. This comprised a stratum of blue clay 0.2 foot thick, followed by sand and gravel as indicated in the margin.	21.4	6.6	4	1½″
7	Coarse sand	28.0	2.2	80	>20
8	Blue clay	30.2	0.1	<3,000	.....
9	Blue quicksand	30.3	17.5	80	25
10	Sand, 75 per cent	47.8	3.7	25	20
	Gravel, 25 per cent	.....	.....	8	2
11	Fine quicksand	51.5	7.5	100	30
12	Sand, 70 per cent	59.0	2.4	30	20
	Gravel, 30 per cent	59.0	2.4	5	1¼″
13	Fine, muddy sand	61.4	1.8	125	30
14	Sand, 20 per cent	63.2	2.1	30	20
	Gravel 80 per cent. Quite dirty in appearance, and contains some very fine material in quite a large proportion.	63.2	2.1	8	1¼″
15	Fine, blue clay. Effervesces to some extent upon the application of nitric acid.	65.3	0.5	<3,000	.....
16	Sand, 40 per cent	65.8	7.5	50	20
	Gravel, 60 per cent. Contains some very fine material.	65.8	7.5	6	1

The pipe rested in sand and gravel at the completion of the boring at 83.3 feet.

Respectfully submitted.

E. H. WILSON,
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BORING No. 20.

Arrived at boring 20 on Thursday, May 1, 1879, at 4 o'clock p. m., and were ready to leave on Saturday, May 3, at 10 o'clock a. m.

Shallow borings, as a rule, do not present any very interesting features, mechanically; and this is no exception.

Located, as it is, upon an island, it shows very little compact material, only one sample presenting clay, and that in such a small quantity that doubts of its existence as a stratum may well be entertained, should one judge by quantity alone.

The boring was completed at a depth of 85 feet, and located on apparently the oldest formation on the island.

No.	Notes and analysis.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Fine sand	0.0	27.0	500	100
2	Sand, 80 per cent	27.0	8.8	50	20
	Gravel, 20 per cent	.....	.....	7	1½″
3	Sand, 95 per cent	35.8	1.7	50	20
	Gravel, 5 per cent	.....	.....	14	4
	Lumps of soft, blue clay are found throughout this sample; some quite large lumps were found in the bottom of the last pump, suggesting the possibility of a stratum $\frac{5}{10}$ of an inch thick, at 37.5 feet between gravel and quicksand.				
4	Blue quicksand	37.5	4.7	100	30
5	Sand, 80 per cent	42.2	3.8	75	20
	Gravel, 20 per cent	.....	.....	10	2
6	Sand	46.0	7.4	200	50
	Clear and fine to 46.4 feet, then mixed with bits of drift-wood, blue clay, and lignite washings.				
7	Sand, 70 per cent	53.4	31.6	30	20
	Gravel, 30 per cent	.....	.....	7	¾″
7 A.	Contains some few gravel stones from sample 7. Some of them contain fossiliferous remains.				

Respectfully submitted.

E. H. WILSON,
Assistant, in charge.

Maj. CHARLES R. SUTER,
Corps of Engineers, U. S. A.

BORING No. 21.

Arrived at boring No. 21, by steam launch Doris, on Thursday, May 22, at 9.30 a. m., from boring No. 30, and left by team for boring No. 23 on Friday, May 23, 1879, at 11.30 a. m.

This boring was completed at a depth of 62 feet, the pipe resting in a stratum of sand and gravel, and having failed to pass through any clay in its descent.

No.	Notes and analysis.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Fine sand	0.0	27.6	80	50
	Very uniform in size of particles.				
2	Sand, 90 per cent	27.6	1.9	30	20
	Gravel, 10 per cent	.....	.....	12	>2″
3	Fine sand	29.5	26.9	100	>20
	Contains some very fine material; lignite washings and drift appeared from 40 to 47 feet.				
4	Sand, 80 per cent	56.4	5.6	25	20
	Gravel, 20 per cent	.....	.....	6	>2″
			62.0		

Respectfully submitted.

E. H. WILSON,
Assistant, in charge.

Maj. CHARLES R. SUTER,
Corps of Engineers, U. S. A.

BORING No. 22.

Arrived at Borum's Landing, by steamer, on Saturday, May 3, 1879, at 5 o'clock p. m., and left on Tuesday, May 6, at 11.30 a. m., for Mill Bayou.

Shallow borings have all been made with the small pipe alone, and the pipe has been sunk by turning. In this boring, however, at a depth of 53 feet, the descent was slow, and rise of material in the pipe frequent, so that the maul was adjusted and the boring completed by driving. Otherwise no difficulty was experienced. The total depth reached was 82.4 feet.

No.	Notes and analysis.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Surface, hard clay	0.0	2.8	<3,000	.....
2	Fine sand	2.8	3.6	200	75
3	Coarse, rusty clay; quite hard	6.4	3.2	<3,000	.....
4	Fine sand and mud; soft and sticky when fresh	9.6	10.0	2,000	300
5	Blue clay, with rusty streaks; very hard when dry	19.6	0.4	<3,000	.....
6	Blue clay, containing roots of trees apparently grown into it.	20.0	0.8	<3,000	.....
7	Blue clay, containing numerous lumps of hard, white clay not distinguishable when dry.	20.8	2.0	<3,000	.....
8	Blue clay, clear Nos. 5, 6, 7, and 8 seem really to be one stratum, presenting different peculiarities, as indicated in the division.	22.8	14.2	<3,000	.....
9	Fine sand	37.0	11.2	250	100
10	Sand and mud, 75 per cent Gravel, 25 per cent This sand, when fresh, looked like leached ashes.	48.2	8.2	75 2	20 >2″
11	Quicksand	56.4	9.8	100	>20
12	Sand, 75 per cent Gravel, 25 per cent None of the clays showed calcareous deposit to the eye, nor did they effervesce to any extent upon the application of nitric acid.	66.2	16.2	100 5	20 1″

Respectfully submitted.

E. H. WILSON,
Assistant, in charge.

Maj. CHARLES R. SUTER,
Corps of Engineers, U. S. A.

BORING No. 23.

The derrick was moved by team from No. 21 to No. 23 on Friday, May 23, 1879, at 2 p. m., and on Saturday, May 24, 1879, it was again moved by hand to the site of boring 25, at 4 p. m.

Boring No. 23 is situated in the dry head of a slough which separates the bar from the main shore when the river is at a higher stage of water. This head seems to have been full of a deposit of blue clay at some recent time, although it remains now only in patches.

Explorations to the depth of 3 feet were made, with a ground auger, in the vicinity, as follows:

No. 1. On clay bank southeast of boring No. 23, distant 100 yards; result: .2 clay on surface, afterwards sand.

No. 2. East of boring No. 23, 200 feet distant; .3 clay at surface, followed by sand.

No. 3. South of boring No. 23, distant 100 yards; 1.2 clay on surface, followed by sand.

No. 4. Southeast of boring No. 23, distant 300 yards, in center of slough bed; 0.2 clay surface, then 1.2 sand, then blue clay, very soft and fine to the bottom.

No. 5. Southeast of boring No. 23, distant 1,000 yards, on Yankee Bar proper; 1.0 clay on surface, followed by sand.

No. 6. East of boring No. 23, distant 1,000 yards; no clay, all sand.

No.	Notes and analysis.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Fine sand	0.0	0.4	100	50
2	Fine mud	0.4	0.8	<3,000	.....
3	Very fine sand, containing dark-colored streaks At 21.5 feet a few (4 or 5) gravel stones were found, with a little clay, supposed to be a pocket, as it was followed by the same sand which preceded it. At 33 feet again were found some gravel stones, embedded in the same sand and followed by it.	1.2	36.2	125	50
4	Sand, 85 per cent	37.4	8.8	30	20
	Gravel, 15 per cent The gravel in this stratum gradnates to 40 per cent. at 40 feet, and back to 10 per cent. at 44 feet.	37.4	8.8	12	$1\frac{3}{8}$″
5	Fine, hard, blue clay	46.2	0.3	<3,000	.....
6	Sand, 60 per cent	46.5	1.8	40	20
	Gravel, 40 per cent The sand in this contains a fair amount of fine material.	46.5	1.8	6	$2\frac{1}{8}$″
7	Fine, gray clay	48.3	0.04	<3,000	.....
8	Fine quicksand	48.34	16.16	80	>20
9	Sand, 75 per cent	64.5	7.5	25	20
	Gravel, 25 per cent Boring finished in sand and gravel at depth of 72 feet.	64.5	7.5	10	$\frac{3}{8}$″

Respectfully submitted.

E. H. WILSON, *Assistant, in charge.*

Maj. CHARLES R. SUTER, *Corps of Engineers, U. S. A.*

BORING No. 24.

Arrived at Fletcher's Field at 5 p. m. Tuesday, May 6, 1879, by team, from Borum's Landing, and left on Thursday, May 8, at 3 p. m., by steamer, for Daniel's Point. Some time was consumed in bridging Mill Bayou to reach Island 28, on which the boring was to be made. This accomplished, the work progressed quite satisfactorily until the boring was completed, at a depth of 77.4 feet.

No.	Notes and analysis.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Surface, sandy soil	0.0	11.8	.....	.....
2	Coarse brown clay	11.8	3.8	<3,000	200
3	Blue clay With rusty streaks, which disappear at 17.	15.6	4.2	<3,000	.....
4	Coarse sand, mud, and lignite Contains very fine material.	19.8	2.0	40	>20
5	Blue clay	21.8	1.0	<3,000	.....
6	Quicksand Fine and dirty.	22.8	1.5	100	30
7	Fine, blue clay	24.3	1.5	<3,000	.....
8	Quicksand Same in appearance as No. 6.	25.8	0.6	120	50
9	Gravel stones	26.6	3.8	.....	.....
	A stratum evidently with little sand, and stones very uniform in size.	26.4	0.2	2	1
10	Blue clay Layers of clay, varying in thickness from .05 to .07, alternating with very thin layers of sand. These layers of clay were subdivided into layers of different colors; some were quite hard, others soft.	30.4	1.4	<3,000	.....
11	Quicksand Rather coarse and dirty; very uniform.	31.8	2.5	100	30
12	Blue clay	34.3	0.5	<3,000	.....
13	Quicksand	34.8	2.4	200	100
14	Sandy, blue clay Apparently alternately thin layers of sand and clay.	37.2	0.2	.....	.....
15	Very fine quicksand	37.4	8.2	120	50
16	Blue clay To 45.8, followed by sand, same as No. 15, to 63.4.	45.6	17.8	<3,000	.....

No.	Notes and analysis.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
17	Sand, 85 per cent	63.4	2.0	30	20
	Gravel, 15 per cent	.....	.....	10	2
	This graduates to 50 per cent. gravel at 65. Average, 5.				
18	Blue clay	65.4	0.04	<3,000	.....
19	Coarse sand	65.44	4.06	25	>20
	Graduating to sand and gravel at depth of 69.5.				
20	Sand, 15 per cent	69.5	3.5	50	20
	Gravel, 85 per cent	.....	.....	6	2
21	Sand	73.0	1.4	50	25

Pipe rested in sand at completion of boring.
Respectfully submitted.

E. H. WILSON, *Assistant, in charge.*

Maj. CHARLES R. SUTER, *Corps of Engineers, U. S. A.*

BORING No. 25.

Arrived at boring 25 from boring 23 on Saturday, May 24, 1879, at 6 p. m., the derrick and apparatus having been carried there by hand; and left by team for boring 27 on Tuesday, May 27, 1879, at 1 p. m.

When at a depth of 35 feet the pipe struck a cottonwood log. Foreseeing that this would delay and retard the work if an attempt were made to pass through it, the pipe was drawn, the derrick moved some few feet, and the work of sinking recommenced. The boring was then pushed to completion without further difficulty.

From the age of the trees in the neigborhood of this boring, the ground on which it is situated would be considered an old formation.

No.	Notes and analysis.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness	Average.	Greatest.
		Feet.	*Feet.*		
1	Fine sand, of clayey consistency	0.0	21.3	500	120
	Contains a large amount of fine material.				
2	Blue clay, with thin streaks of sand and mold	21.3	2.7	<3,000	.....
3	Fine, blue sand	24.0	13.8	750	100
4	Sand, 75 per cent	37.8	0.4	100	20
	Gravel, 25 per cent	.....	.....	7	1½
	Sand very fine and uniform, of clayey consistency.				
5	Sandy clay	38.2	0.8	125	50
	Gravel, 20 per cent	.....	.....	5	1″
	Contains a large amount of fine material, bits of wood and small black roots. The clay seems to have been a dividing line between Nos. 4 and 5, although all mixed up with the rest of the sample.				
6	Quicksand	39.0	4.7	100	>20
7	Fine, blue clay	43.7	0.2	<3,000	.....
8	Sand	43.9	1.9	80	50
	Very uniform in size of particles; coarser and cleaner than No. 6.				
9	Sand, 85 per cent	45.8	3.5	45	20
	Gravel, 15 per cent	.....	.....	5	1½″
10	Blue clay	49.3	0.02	<3,000	.....
11	Sand, 60 per cent	49.32	4.08	25	20
	Gravel, 40 per cent	.....	.....	12	2″
	Contains fine lignite, sufficient to give a dark color when fresh.				
12	Sand	53.4	23.0	50	>20

Pipe rested in sand at completion of boring, at 76.4 feet.
Respectfully submitted.

E. H. WILSON, *Assistant, in charge.*

Maj. CHARLES R. SUTER, *Corps of Engineers, U. S. A.*

BORING No. 26.

Arrived at boring No. 26, by steamer, from Fletcher's Landing, on Thursday, May 8, 1879, at 4.30 p. m., and left by steamer Octavia for Forked Deer Island (No. 27) on Saturday, May 10, 1879, at 12.30 p. m.

This boring was made with no difficulty and very little labor, the pipe sinking nearly of its own accord to a depth of 90 feet, the extent of the boring. This, perhaps, was owing to the fact that nearly all the material gone through was sand, strata of blue clay being few and nearly insignificant in thickness.

The boring was located on apparently the oldest formation in the vicinity.

No.	Notes and analysis.	Location of layer.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Surface soil, hard clay	0.0	2.6	<3,000	.....
2	Fine sticky sand. Very uniform in size of particles.	2.6	14.2	1,000	300
3	Coarse blue clay. Hard on top, and becoming soft as it descends; apparently alternate thin layers of clay and sand hardly noticeable before partially drying.	16.8	3.2	<3.000	.....
4	Fine blue sand. Contains some very fine material.	20.0	7.0	200	100
5	Blue clay. Apparently alternate layers, as in No. 3	27.0	0.75	<3,000	.....
6	Sand. Apparently much coarser than No. 4, going to prove that No. 5 existed as a stratum.	27.75	1.85	50	20
7	Hard blue clay	29.6	0 5	<3,000	.....
8	Coarse, dirty sand, 85 per cent.	30.1	5.3	40	20
	Gravel, 15 per cent. Contains lumps of clay, mold, stones, sticks, mud, and what might be taken for ashes; contains very fine material. Graduates to 80 per cent.; gravel at 35.4 feet	.....	.....	3	2″
9	Blue clay. Apparently mold to 35.45 feet; thin clay to 35.7 feet.	35.4	0.3	<3,000	.....
10	Sand, 40 per cent	35.7	5.1	100	20
	Gravel, 60 per cent	.....	.....	3	1¼″
11	Quicksand	40.8	1.4	75	>20
12	Fine blue clay	42.2	0.4	<3,000	.....
13	Fine quicksand. Very uniform in size of particles.	42.6	2.2	100	50
14	Gravel stones	44.8	19.4	2	1¼″
	Lying in quicksand from 44.8 feet to 45.4 feet, followed by blue clay to 45.42 feet, then followed by sand, same as No. 13, from 45.42 feet to 64.2 feet.	.....	.....	<3,000	.....
15	Blue clay	64.2	0.03	<3,000	.....
16	Dirty sand, 65 per cent	64.23	14.17	50	20
	Gravel, 35 per cent. Contains some very fine material.	.....	.....	7	1¼″
17	Coarse sand	78.4	5.6	50	30
18	Sand, 75 per cent.	84.0	0.6	35	20
	Gravel, 25 per cent	.....	.....	5	1″
19	Coarse sand	84.6	5.4	30	>20

Pipe rested in sand at completion of boring.

Respectfully submitted.

E. H. WILSON,
Assistant, in charge.

Maj. CHARLES R. SUTER,
Corps of Engineers, U. S. A.

Boring No. 27.

Arrived at boring No. 27 from boring No. 25, by teams, on Tuesday, May 27, 1879, at 5 o'clock p. m., and were ready to leave on Thursday, May 29, 1879, at 11 o'clock a. m.

No difficulty was experienced during the course of the boring.

Judging from the growth of timber, the formation would not be considered a very old one.

N. B.—The formation is a comparatively old one, the young growth of timber noted resulting from the desertion of an old cultivated field.

No.	Notes and analysis.	Location of layer.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Fine sand	0.0	2.2	300	100
2	Hard brown clay	2.2	2.3	<3,000	.....
3	Fine sand	4.5	17.3	250	75
4	Hard blue clay	21.8	0.3	<3,000	.....
5	Sand	22.1	6.4	80	35
6	Sand, containing rotten wood and lignite	28.5	0.5	80	50
7	Sand, clear, same as No. 5	29.0	1.4	80	50
8	Sand, 70 per cent	30.4	0.5	30	20
	Gravel, 30 per cent	.....	.....	7	1¾″
9	Clay, a very thin stratum	30.9	0.01	<3,000	.....
10	Brown sand	30.91	33.59	60	>20
	Quite fine; growing coarser, and changing gradually into gray sand, such as is shown in sample No. 10 A.				
10 A	Very coarse gray sand	64.5	1.5	25	>20
11	Sand, 40 per cent	66.0	6.0	30	20
	Gravel, 60 per cent	.....	.....	8	⅞″
	Sand in this appears to be the same as in No. 10 A. The gravel graduates to 25 per cent. at 68 feet, and disappears gradually, being all gone at 72 feet. A pebble containing shell remains was found at 69 feet, and has been preserved separately.				
12	Coarse sand, containing lignite washings	72.0	8.5	30	>20
	Contains one fossiliferous pebble found at 74 feet. Grows gradually finer from 73 feet, and more bluish in color. Finer to 76 feet, then coarser to 80 feet, where gravel appears.	.....	.....	.....	>20
13	Sand, 75 per cent	80.5	5.8	75	20
	Gravel, 25 per cent	.....	.....	10	½″
	Changing to a muddy brown color, with quite a good deal of muddy wash. From 83.5 feet the gravel gradually decreases in amount to 10 per cent. at 86.3 feet, the bottom of the boring.				
13 A	At 83 feet was found apparently a ball of blue clay, which, upon examination, proved to be a lot (6 or 7) of lumps of hard white clay held together by blue clay. They were preserved as sample 13 A.				

Respectfully submitted.

E. H. WILSON,
Assistant, in charge.

Maj. CHARLES R. SUTER,
Corps of Engineers, U. S. A

BORING No. 28.

Arrived at Dr. O'Donnell's Landing on Thursday, May 15, 1879, at 6 p. m., and were ready to leave on Saturday, May 17, 1879, at 12 m. There were no mechanical difficulties connected with this work. Progress was rather slower than usual, but uniform. Ten years ago, the point on which this boring is situated was one-half mile distant from the river; it is now on the river bank; consequently the formation is an old one.

No.	Notes and analysis.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Sandy loam. Contains a large amount of fine material.	0.0	2.3	100	50
2	Blue clay, with rusty streaks	2.3	2.8	<3,000	.....
3	Fine red sand. Contains a large amount of fine material.	5.1	0.9	200	50
4	Blue clay. In layers ¼″ thick separated by layers of sand and lignite of the same thickness.	6.0	0.7	<3,000	.....
5	Fine sand. Apparently the same as No. 3.	6.7	1.1	200	50
6	Hard blue clay	7.8	2.7	<3,000	.....
7	Fine sand. Contained spots of different colors, which were patches of discolored sand; cause unknown.	10.5	4.5	400	100
8	Fine blue mold	15.0	0.4	.....	.....
9	Blue sand	15.4	5.6	120	75
10	Blue clay. This more properly seems to be mold.	21.0	6.8	<3,000	.....
10 A	Sand. From 22.5 feet to 22.95 feet, which contained numerous shell remains. Two lumps of white clay, quite hard, are also inclosed in 10 A. They were found at 27 feet. All the above were in stratum of blue clay, No. 10.	22.5	0.45	.....	.....
11	Blue quicksand. Uniform in size of particles, but contains a large amount of very fine material.	27.8	14.2	100	25
12	Sand, 75 per cent	42.0	1.5	50	20
	Gravel, 25 per cent	.....	.....	6	1½″
13	Sand	43.5	7.1	30	>20
14	Sand, 60 per cent	50.6	10.6	25	20
	Gravel, 40 per cent	.....	.....	7	1
15	Coarse sand	61.2	18.2	50	>20

The pipe rested in sand at completion of boring.
Respectfully submitted.

E. H. WILSON,
Assistant, in charge.

Maj. CHARLES R. SUTER,
Corps of Engineers, U. S. A.

BORING No. 29.

Arrived at boring 29, by steamer, from No. 27, on Thursday, May 29, 1879, at 11 o'clock p. m., and were ready to leave for No. 32 Monday, June 2, 1879, at 4 p. m.

No work was done on Saturday, May 31, as it rained all day. In using a ship auger to pass through lignite at 46.74 feet, the auger became clogged, and a drill-rod coupling broke 30 feet under ground in attempting to draw it. The remaining portion was readily recovered. An examination of the bluff for a mile below the boring shows the following: Commencing from above, gravel and sand, 20 feet thick at the thickest point, being less at other places; then hard clay, whitish in color, 10 feet; then in some places a beautifully mottled marl or clay, in others blue clay, 4 feet; followed by lignite, 8 feet, the same as in the result of the boring, as far as could be seen. The bluff does not present a perpendicular face at the site of the boring, but a gentle ascent covered with grass and trees, so that a section was not taken in connection with the boring.

From the conformity of the strata in the boring to those disclosed in the face of the bluff, they are supposed to be the same undisturbed formation, with the difference that in the boring the top strata of gravel and sand, clay, and marl have been washed away and replaced by sandy clay from the river.

All samples of sand and clay brought up from below 25 feet turned dark very quickly after being exposed to the light and air, on account of lignite wash which they contained.

None of the clays showed any amount of effervescence upon the application of nitric acid.

The materials were all well compacted, and did not rise in the pipe.

No.	Notes and analysis.	Location of layer.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Sandy clay; growing finer	0.0	9.0	400	125
2	Gravel stones Deposited in sandy clay; soft at first, but hardening on exposure.	9.0	0.7	2	¾″
3	Hard, sandy, blue clay With a sandy grit, but clayey consistency—homogeneous mixture; contains some lignite wash and a large amount of very fine material.	9.7	9.5	150	100
4	Sand and clay Mixed like No. 3, but of a dark-brown color. Contains some fine lignite and a large quantity of very fine material.	19.2	5.4	200	75
5	Clay of different colors, black, white, and blue Some lumps of sand also found in it; uniform color when dry.	24.6	3.0	<3,000	.....
6	Hard, sandy, blue clay Alternating with thin laminæ of sand.	27.6	0.9	1,000	300
7	Hard clay All colors; seems to be in layers about one inch thick. It seems of an uniform color when dry.	28.5	0.5	<3,000	.....
8	Dark-brown lignite and clay Turns black on exposure to light and air very quickly.	29.0	0.5	.....	.....
9	Dark-brown lignite; pure and unmixed with clay	29.5	5.9	.....	.....
10	Sandy clay Immediately underlying lignite; changing color on exposure.	35.4	0.1	100	75
11	Fine, light-gray quicksand Changes on exposure.	35.5	4.0	125	90
12	Light-blue sandy clay Changes on exposure; contains some very fine material.	39.5	0.05	200	90
13	Light-blue sand Very fine, changing to a whitish gray, thin light brown on exposure.	39.55	2.15	100	90
14	Sand, blue clay Changing on exposure; contains a large amount of fine material.	41.7	0.05	100	90
15	Fine light-brown sand, changing on exposure	41.75	2.25	100	80
16	Sandy clay, with streaks of very fine material	44.0	0.1	100	75
17	Gray sand; coarser than No. 15	44.1	2.1	80	50
18	Sandy clay, with small black streaks	46.2	0.05	300	100
19	Brown sand, quite dark, but growing lighter as it descends	46.25	0.45	150	90
20	Brown sandy clay Containing about 5 per cent. of sand, with largest 100 and average 200.	46.7	0.04	1,000	.....
21	Clear brown lignite	46.74	2.46	.....	.....
22	Lignitic clay Getting harder as it descends, changing color decidedly and quickly on exposure, and lignite growing less until it disappears at 53 feet; clay then grows softer and more sandy until it becomes No. 23.	49.2	10.8	<3,000	.....
23	60 feet sandy clay	60.0	3.2	500	200
24	63.2 feet brown lignite	63.2	0.15	.....	.....
25	Clay, sandy Alternate layers of blue and brown, but so soft as to be thoroughly mixed by the pumps. Characters determined by some few lumps which came up intact.	63.35	14.15	300	100
26	Hard, blue, sandy clay Laminated like slate, continuing to end of boring at 80 feet.	77.5	2.5	<3,000	.....

Respectfully submitted.

E. H. WILSON,
Assistant, in charge.

Maj. CHARLES R. SUTER,
Corps of Engineers, U. S. A.

BORING No. 30.

Arrived at boring 30, by steam launch Doris, on Tuesday, May 20, 1879, at 8 o'clock a. m., and left by the same means on Thursday 22nd, at the same hour.

A few feet from where the boring is located, the bar rises by an abrupt bluff bank, some 12 feet higher into a sort of tow-head, covered with young willows and cottonwoods, and showing a stratum of clay, several feet thick in its exposed section.

A violent storm of wind and rain prevented any work during the afternoon of Tuesday, May 20, 1879.

No.	Notes and analysis.	Location of layer.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Fine red sand	0.0	21.6	100	20
2	Blue clayey sand	21.6	0.7	1,000	100
3	Sand	22.3	10.5	100	>20
4	Sand, 85 per cent	32.8	1.4	50	20
	Gravel, 15 per cent	.....	.....	10	2
5	Sand	34.2	5.8	40	>20
6	Fine blue clay	40.0	1.2	<3,000	.....
7	Sand	41.2	18.4	35	20
	Contains some very fine material.				
8	Sand, 70 per cent	59.6	12.4	65	20
	Gravel, 30 per cent	.....	.....	4	>2″
	This stratum graduates to 60 per cent. gravel at 65 feet, and back to 15 per cent. at 72 feet, where the boring was finished, the pipe resting in sand and gravel.				
		.....	72.0	bottom.	

Respectfully submitted.

E. H. WILSON,
Assistant, in charge.

Maj. CHARLES R. SUTER,
Corps of Engineers, U. S. A.

BORING No. 31.

Arrived at this boring by steamer, from No. 42, on Thursday, June 12, 1879, at 1.30 p. m., and were ready to leave on Saturday, June 14, 1879, at 6 a. m. At 63.6 feet gravel was struck, followed by clay, in which the pipe was stopped, while the pumps were worked beyond to a greater depth. This clay seemed, when fresh, very similar to the clay overlying lignite in the Tertiary formation, as shown in the bluff below Randolph, Tenn. But it showed no shell remains under the glass, nor did it effervesce upon the application of nitric acid, and finally it was decided that the clay was not of that formation probably. The pumps were worked to 85 feet in an endeavor to find lignite, but unsuccessfully, and the material became so soft that they could not be worked farther without the pipe. Time not allowing this, the boring was pronounced complete at that depth.

No.	Notes and analysis.	Location of layer.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Fine sand	0.0	0.5	1,000	100
2	Brown sandy clay	0.5	9.0	<3,000	.....
	Growing softer and more sandy.				
3	Fine brown sand	9.5	14.8	400	100
	Gradually turning blue at 21 feet.				
4	Blue clay, with sandy streaks	24.3	1.9	<3,000	.....
	Growing softer.				
	Fine blue sand	26.2	10.6	400	75
	Very muddy. Contains some few black lumps of mud.				

No.	Notes and analysis.	Location of layer.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
6	Sandy blue clay	36.8	4.2	500	300
7	Sand Containing a few bits of driftwood.	41.0	1.7	400	100
8	Fine quicksand Contained a few gravel stones, which seemed to be from a pocket, not a stratum.	42.7	1.6	100	50
9	Blue clay, with a few white lumps	44.3	1.1	<3,000	.....
10	Sand, 70 per cent	45.4	1.0	100	20
	Gravel, 30 per cent	.....	.....	5	1⅞″
	Muddy; growing cleaner. Gravel rapidly increasing to 95 per cent.				
10 A.	Sand, 5 per cent	46.4	2.6	100	20
	Gravel, 95 per cent	.....	.....	4	2½″
	Gradation from No. 10. Gravel decreasing to 40 per cent. at 52 feet; 15 per cent. at 57 feet.				
11	Coarse gray sand	59.0	4.6	50	>20
12	Sand, 65 per cent	63.6	11.6	50	20
	Gravel, 35 per cent	.....	.....	6	1⅜″
13	Lignite washings and mud	75.2	0.1	.....	.....
14	Hard brown clay	75.3	9.7	<3,000	.....
14 A.	Sand Gradation from 14 to 14 A. No. 14 growing softer and more sandy until it becomes sand at 85 feet bottom.	85.0	.....	400	50

Respectfully submitted.

E. H. WILSON,
Assistant, in charge.

Maj. CHARLES R. SUTER,
Corps of Engineers, U. S. A.

BORING No. 32.

The derrick and pipe were brought from boring No. 29 to No. 32, in a skiff, on Monday, June 2, 1879, at 6 o'clock p. m. The boring was commenced Tuesday, June 3, at 7 a. m., and completed Wednesday, June 4, at 12 m.

The boring was unusually devoid of interest, presenting neither accident, delay, nor interruption, and an extremely small variety of materials resulting from it.

The formation, judging from the timber upon it, seems to be an old one.

No.	Notes and analysis.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Surface soil; hard clay	0.0	1.8	<3,000	.....
2	Fine brown sand Seems hard when fresh, but works up very soft in pumping. At 15 feet were a few streaks of a different color, but in texture the same.	1.8	21.2	500	200
3	Sandy clay, in thin layers of brown and blue Contains fine lignite washings.	23.0	2.6	1,000	100
4	Dark-blue clay; rather sandy	25.6	0.8	<3,000	300
5	Fine brown sand Contains a very large amount of fine material.	26.4	2.3	100	75
6	Blue clay With layers of rusty dark-brown like iron rust. Contains a large proportion of fine material.	28.7	0.1	100	75
7	Coarse sand With some muddy substance; has quite a sprinkling of fine lignite; brown in color, and turning darker and growing coarser at 43 feet.	28.8	19.7	100	75
8	Gray sand Differs apparently from No. 7 only in color. A little finer at 62 feet.	48.5	13.5	50	30

No.	Notes and analysis.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
9	Gray sand Finer than No. 8; more dirty wash and more bluish color at 70 feet.	62.0	15.0	100	30
10	Gray sand Finest portion; grows gradually coarser from here; contains a sprinkling of lignite washings.	77.0	7.2	120	50
11	Sand, 88 per cent	84.2	2.8	120	20
	Gravel, 12 per cent	.....	.....	5	1
	Continues to end of boring at 87 feet.				

Respectfully submitted.

E. H. WILSON,
Assistant, in charge.

Maj. CHARLES R. SUTER,
Corps of Engineers, U. S. A.

BORING NO. 33.

Arrived at boring 33, by skiff, from No. 44, on Tuesday, June 17, 1879, at 1.30 p. m., and were ready to leave on Thursday, June 19, 1879, at 8 a. m.

This boring was made very easily as far as 70 feet, when a stratum of gravel was struck, which lasted to the bottom, and through which sinking was slow and laborious.

The timber surrounding this boring is young, and the formation is not supposed to be very old.

No.	Notes and analysis.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Fine sandy clay Quite hard at surface, growing softer and more sandy.	0.0	9.5	2,000	500
2	Blue clay; growing softer and more sandy.	9.5	2.7	<3,000	.....
3	Fine blue sand	12.2	0.8	400	100
4	Blue clay; fine and hard; a little softer at 19 feet	13.0	21.0	<3,000	.....
5	Dead leaves; mixed with sand	34.0	0.8	500	300
6	Mud and dead leaves; mixed with sand	34.8	1.4	500	300
7	Sandy brown clay Quite soft; turns bluish from 38 feet and a little finer; very soft at 40 feet, with streaks of fine sand; hardening to fine blue clay at 43 feet; softer again at 46 feet, and a little coarser; harder and finer at 48 feet.	36.2	16.3	<3,000	.....
8	Very fine blue sand Soft and muddy, growing coarser and cleaner at 54 feet.	52.5	4.3	700	150
9	Hard blue clay	56.8	0.7	<3,000	.....
10	Soft gritty mud; contains bits of dried leaves and mud	57.5	2.9	200	100
11	Hard fine blue clay	60.4	1.2	<3,000	.....
12	Gritty mud Same as No. 10; dark color, growing sandy from 65 feet.	61.6	5.4	400	75
13	Coarse sand and mud; gradually growing coarser and cleaner.	67.0	3.2	100	30
14	Sand, 75 per cent	70.2	22.6	100	20
	Gravel, 25 per cent	.....	.....	12	2
	Gravel increasing to 40 per cent. at 73 feet, growing less to 10 per cent. at 76 feet, more to 60 per cent.; average 7 to an inch at 79 feet; continues to end of boring, 92.8 feet.				

Respectfully submitted.

E. H. WILSON,
Assistant, in charge.

Maj. CHARLES R. SUTER,
Corps of Engineers, U. S. A

BORING NO. 34.

Arrived, per steamer Osceola Belle, at the lower end of Fletcher's Field, Ark., from Elmot Landing, on night of June 5, and were ready to leave on afternoon of June 12.

The sand found in boring was generally quite fine and muddy, and packing about pipe offered great resistance to twisting. The large pipe was sunk to depth of 120 feet, whence the boring was completed without sheathing. At 116.5 feet a bed of clay, free from vegetable growth, was encountered, which continued 50 feet. Nothing similar has been found in any of the preceding borings. At different depths the clay was so hard that the augers were used, the pumps refusing to feed. The wood augers have been partly encased in gas pipe, and not only cut, but bring up material satisfactorily.

The boring was pronounced completed at 171.3 feet, shortly after passing through a layer of lignite. No unusual accidents delayed the progress of the work.

No.	Apparently before drying.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Light-brown sandy clay	0.0	1.8	800	200
2	Brown clay. Sample is from 4.7 feet. From 1.8 feet to 4.7 feet it is brown clay, light-brown sandy clay and frequently streaks of sand; thence it is brown clay. Contains a few small roots.	1.8	4.4	1,500	1,000
3	Light-brown sand	6.2	2.5	200	60
4	Brown clay. Contains streaks of reddish-brown clay, light-brown clay, and sand.	8.7	2.3	2,000	1,500
5	Light-brown sand. The upper part of this layer is fine sand. The coarseness increases with the descent. Sample is from 14.7 feet.	11.0	10.7	300	100
6	Bluish clay and gray sandy clay	21 7	0.1	1,500	500
7	Light-brown sand. Hard when dry.	21.8	1.0	250	100
8	Bluish clay and gray sandy clay	22.8	0.1	1,500	500
9	Light-brown quicksand. The upper part of this layer is light-brown sand. The coarseness increases slightly and the color gradually changes to dark-gray on descending.	22.9	7.1	175	80
10	Bluish sandy clay	30.0	0.3	500	100
11	Dark quicksand	30.3	2.1	250	100
12	Blue clay. From 32.4 feet to 35.8 feet, clay is of fine texture and contains sandy streaks. From 35.8 feet to 39.1 feet, it is blue sandy clay. Coarseness increasing with the descent.	32.4	6.7	3,000	.....
13	Dark gray sand. From 54 feet, thence coarseness increases.	39.1	18.1	150	80
14	Dark-gray sand, 65 per cent	57.2	13.8	100	20
	Gravel, 35 per cent. Sample is from 58 feet. Contains particles of lignite. Coarseness increases with the descent. At 58 feet, it is 80 per cent. sand and 20 per cent. gravel. At 70 feet, it is 50 per cent. sand and 50 per cent. gravel.	.....	.....	12	$2\frac{3}{4}''$
4 A.	Several pebbles are preserved, the largest of which is $2\frac{3}{4}$ by $1\frac{3}{8}$ by $\frac{7}{8}$ inches. Some of them contain fossils.				
15	Gray sand, 95 per cent	71.0	10.0	65	20
	Gravel, 5 per cent. Contains particles of lignite.	.....	.....	15	$1\frac{1}{4}''$
5 A.	Largest pebble ($1\frac{1}{2}$ by $\frac{7}{8}$ by $\frac{1}{2}$ inches) and several others are preserved. Some of them contain fossils.				
16	Dark sand. Contains particles of lignite. Two pebbles (the largest of which is $2\frac{1}{2}$ by $1\frac{1}{2}$ by $\frac{7}{8}$ inches) were found and preserved.	81.0	10.0	100	30
17	Bluish clay	91.0	0.3	<3,000	.....
18	Gray sand, 50 per cent	91.3	22.5	125	20
	Gravel, 50 per cent. Contains particles and rounded lumps of lignite and many large pebbles. The sand is finer in the upper part of this layer. From 98 feet to 102 feet, it is about 20 per cent. gravel and 80 per cent. sand; thence it is 50 per cent. sand and 50 per cent. gravel.	.....	.....	3	$4\frac{1}{8}''$
18 A.	Pebbles preserved (many of them containing fossils) and two rounded lumps of lignite, from 91.3 feet to 113.8 feet.				
19	Bluish clay, grayish when dry; coarseness increasing with the descent.	113.8	1.6	<3,000	200
20	Gray sand, 80 per cent	115.4	1.1	100	20
	Gravel, 20 per cent. Great lack of uniformity in size of particles of sand.	.....	.....	10	2

No.	Apparently before drying.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
21	Clay. At 117 feet it is bluish clay, thence to 151 feet it grows lighter with the descent, thence grows darker. At 165 feet it is bluish clay. The clay was brought up in pump as stiff clay to 140 feet, thence most of it came up as pasty clay. The texture changed from fine to coarse and coarse to fine frequently on descending. Clay is very hard in some places, especially so at 126 feet. The sample consists of several lumps of clay, labeled with the respective depths at which they were found.	116.5	50.1	3,000	100
2	Black lignite. Particles of gravel were found in the lignite, but as hole was not sheathed cannot tell whether or no they belong to stratum of lignite. From 169.5 feet to 170 feet lignite contains some brownish clay.	166.6	3.4	.....	.....
23	Dark clay. Contains some lignite. At 170.5 feet it is light-brown; thence it grows darker. From 171 feet it grows coarser. Boring ended at 171.3 feet.	170.0	.....	1,500	500

Respectfully submitted.

E. H. WILSON, *Assistant, in charge.*

Maj. CHARLES R. SUTER,
Corps of Engineers, U. S. A.

BORING NO. 36.

Arrived at boring 36 from No. 38, by skiff, on Friday, June 6, 1879, at 2 p. m., and were ready to leave on Saturday, June 7, 1879, at 12 m.

The timber in the vicinity of this boring is very similar to that near boring No. 38, suggesting the idea that it is all one and the same formation. This idea is strengthened after comparing the results of the two borings and noticing how similar they are. The boring otherwise is of no especial interest.

No.	Notes and analysis.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Sandy clay, in thin layers $\frac{1}{30}$ inch thick; growing a little more sandy, and rusty at 5 feet.	0.0	6.3	<3,000	.....
2	Hard brown clay, gradually growing softer. Very soft and muddy at 12 feet and getting more sandy.	6.3	13.1	<3,000	.....
3	Sandy blue clay; quite soft.	19.4	6.2	<3,000	200
4	Very fine blue sand. Contains a large amount of fine material.	25.6	2.4	500	100
5	Sandy blue clay; growing gradually more sandy.	28.0	9.7	1,000	100
6	Fine blue sand, sticky; continues without change to 59 feet, where it grows a little coarser.	37.7	34.8	200	100
7	Cottonwood and sand. Stick, but cut up by pump and thoroughly mixed with sand. Some few gravel stones were also found.	72.5	0.3	100	.....
8	Coarse gray sand, 25 per cent.	72.8	1.4	75	20
	Gravel, 75 per cent. Gravel rapidly diminishes in quantity.	.....	.....	4	$1\frac{3}{4}$″
9	Coarse gray sand.	74.2	5.4	50	20
10	Sand, 20 per cent.	79.6	8.4	25	20
	Gravel, 80 per cent. Relative amounts remaining the same, the gravel increases in size to 7 to an inch and continues so to end of boring at 88 feet.	.....	.....	10	2″

Respectfully submitted.

E. H. WILSON, *Assistant, in charge.*

Maj. CHARLES R. SUTER, *Corps of Engineers, U. S. A.*

BORING No. 38.

Arrived at boring 38, by steamer from No. 32, on Thursday June 5, 1879, at 11 a. m., and left on Friday June 6, 1879, at 12 m. The ground on which this boring is located is of comparatively old formation. The boring itself was made without accident, and in remarkably little time.

It presented nothing to elevate it above the majority of shallow borings already made.

No.	Notes and analysis.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Sandy clay	0.0	11.7	<3,000	.....
	Surface soil hard and in thin layers at the surface; growing softer as it descends.				
2	Hard brown clay, gradually growing softer	11.7	6.7	<3,000	.....
	Contains dark rusty streaks.				
3	Sandy blue mud, very soft when fresh	18.4	3.2	1,000	400
4	Fine hard blue clay	21.6	1.6	<3,000	.....
5	Very fine brown sand	23.2	8.5	300	100
6	Blue clay	31.7	0.03	<3,000	.....
7	Fine blue sand	31.73	4.57	100	90
8	Blue clay	36.3	0.7	<3,000	.....
9	Blue sand, fine and rather dirty	37.0	10.0	100	50
	From 42 feet begins gradually to grow coarser, and graduates to gravel at 47 feet.				
10	Sand, 85 per cent	47.0	2.5	75	20
	Gravel, 15 per cent	.....	.....	7	¾″
	Sand graduates to 40 per cent.; gravel, to 49.5 per cent.				
11	Sand and small gravel held together, like a conglomerate, by finely divided lignite.	49.5	0.05	.....	.....
12	Coarse gray sand, growing gradually finer to 60 feet, then rapidly coarse again.	49.55	13.45	50	>20
13	Sand, 65 per cent	63.0	6.5	25	20
	Gravel, 35 per cent	.....	.....	10	2″
	Gravel increases to 75 per cent. at; 66feet, then decreases and disappears at 69.5 feet; contains a large amount of fine material.				
14	Coarse sand and fine lignite	69.5	4.0	100	30
	Growing finer with more dirty wash at 73 feet, then changes suddenly to gravel; contains a large gravel stone at 72 feet.				
15	Sand, 85 per cent	73.5	8.0	50	20
	Gravel, 15 per cent	.....	.....	4	1
	Gravel disappears after first pumpful, but sand continues of same texture to the bottom of the boring at 81.5 feet.				

Respectfully submitted.

E. H. WILSON,
Assistant, in charge.

Maj. CHARLES R. SUTER,
Corps of Engineers, U. S. A.

BORING No. 40.

Arrived at this boring, by steamer from No. 36, on Saturday, June 7, 1879, at 7.30 p. m., and moved the boring apparatus to the site of No. 42 by skiff on Tuesday, June 10, 1879, at 8 a. m.

Some little trouble and delay were caused by the frequent breaking of the wire rope used for raising the pumps, it having become worn and partially rotten from long and continual use.

The formation on which the boring is located is an old one.

No.	Notes and analysis.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Fine sandy soil	0.0	1.4	<3,000	.....
2	Hard brown clay	1.4	3.2	<3,000	.....
3	Fine brown sand	4.6	7.6	1,000	300
4	Light brown clay Containing a large amount of much coarser material in sandy streaks.	12.2	0.1	<3,000	.....
5	Brown sand Fine and muddy; grows a little coarser at 25 feet; contains a large amount of fine material.	12.3	14.7	125	90
6	Sandy blue clay Hard at first, but grows gradually softer.	27.0	1.6	<3,000	.....
7	Fine blue sand, with quite a lot of mud Grows gradually cleaner and coarser to 37.7 feet, where sample 7 A was taken. Contains a very large amount of fine material.	28.6	9.1	100	50
7 A.	Sand Gradation from preceding sample.	37.7	0.2	75	40
8	Blue clay Fine and hard; getting soft and sandy as it descends.	37.9	2.4	<3,000	.....
9	Fine blue sand With a large amount of fine muddy material, growing coarser but retaining the mud.	40.3	8.8	90	35
10	Sand, 55 per cent	49.1	20.4	50	20
	Gravel, 45 per cent	.....	.....	10	1¼″
	Contains some lignite. Gravel and lignite decreases in quantity, but stones become larger at 53 feet, average 4 to an inch, about 8 per cent. At 69.5 feet increases to 85 per cent. suddenly. Sand contains large amount of fine material.				
10 A.	Bits of wood and lignite found in No. 10 at	69.0	.....	.....	.....
11	Sand, 15 per cent	69.5	0.9	45	20
	Gravel, 85 per cent	.....	.....	5	1½″
11 A.	Rotten cottonwood A stick or chunk. The gravel must have gathered around it, as it disappears immediately afterwards.	70.4	0.8	.....	.....
12	Coarse sand	71.2	6.2	75	20
13	Sand and lignite, 60 per cent	77.4	3.6	40	20
	Gravel, 40 per cent	.....	.....	4	2
	This contains sufficient lignite to make a black wash when mixed with water.				
	Continues to end of boring at 81 feet.				

Respectfully submitted.

E. H. WILSON,
Assistant, in charge.

Maj. CHARLES R. SUTER,
Corps of Engineers, U. S. A.

Boring No. 42.

The boring equipment was brought here from No. 40 on Tuesday, June 10, 1879, at 8 a. m., and the boring was finished, the pipe up, and the derrick down on Wednesday, June 11, 1879, at 1 p. m.

On account of the loose nature of the material through which the pipe passed, rises were very frequent and extensive; consequently progress was not so rapid as it would otherwise have been.

At 79.3 feet a sort of pudding stone was met. It seemed to be quite extensive, for after the pump had passed through, the pipe still rested on it, preventing the further descent of the pipe. The pumps were carried to the bottom at 82 feet, 2.7 feet beyond the pipe.

No.	Notes and analysis.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Fine sand	0.0	37.0	100	90
	Grows coarser from 12 feet to 18 feet, then the same to 37 feet, then coarser.				
1 A	Bits of wood passed in No. 1 at 26 feet	26.0	.....	.....	.....
2	Sand	37.0	7.0	75	30
	Gradation from No. 1.				
3	Sand, 93 per cent	44.0	10.2	40	20
	Gravel, 7 per cent	.....	.....	8	1½″
	Gravel light to 49 feet, then rapidly increases to 90 per cent. at 51.5 feet, then decreases again. Average size the same.				
4	Blue clay	54.2	0.02	<3,000	.....
5	Coarse, gray sand, with quite a sprinkling of lignite	54.22	8.58	25	>20
	At 59.6 feet a few gravel stones appear. At 62.8 feet gravel commences to increase.				
6	Sand, 75 per cent	62.8	6.2	35	20
	Gravel, 25 per cent	.....	.....	7	1
	Gravel increasing to 50 per cent. at 66 feet, and 90 per cent. at 69 feet.				
7	Sand, 10 per cent	69.0	13.0	100	20
	Gravel, 90 per cent	.....	.....	16	4
	Gradation from last sample. At 72 feet gravel decreases in quantity and increases in size to 76 feet; the quantity again increases to 30 per cent. at 76 feet, 75 per cent. at 79 feet and remains so to end of boring, at 82 feet.				
7 A	Pieces of pudding stone penetrated by pump	79.3	.....	.....	.....

Respectfully submitted.

E. H. WILSON,
Assistant, in charge.

Maj. CHARLES R. SUTER,
Corps of Engineers, U. S. A.

BORING No. 44.

Arrived at this boring by steamer on Saturday, June 14, 1879, at 7 p. m., and left by skiff for No. 33 on Tuesday, June 17, 1879, at 12.30 p. m.

Some little trouble was experienced with the tools, which are becoming very much worn.

A pudding stone, pieces of which are preserved, was met at 82 feet and passed through without difficulty.

The boring was completed at a depth of 100.2 feet in sand.

The timber surrounding seems to be of rather recent growth, but the formation is probably an old one.

No.	Notes and analysis.	Location of layers.		Diameters to an inch.	
		Depth.	Thickness.	Average.	Greatest.
		Feet.	*Feet.*		
1	Fine sandy soil	0.0	2.3	1,000	500
2	Sandy blue clay Turning brown, with dark, rusty streaks, from 5 feet quite hard; softer and more sandy at 9 feet.	2.3	10.9	1,000	.....
3	Hard blue clay Red streaks to 13.4 feet; then clear.	13.2	6.1	<3,000	.....
4	Sand Contains a large amount of mud; grows coarser from 24 feet to 28.5 feet, but retains mud. There were a few small lumps of clay, apparently the result of wash; grows finer and cleaner at 31 feet; coarser again from 33 feet.	19.3	20.7	75	30
4 A	Sand Coarse gray, gradations from No. 4. Coarsest part then begins to grow fine.	40.0	14.2	30	>20
4 B	Gravel A few stones found in fine sand from 47 feet to 49 feet.	47.0	2.0	.....	.....
5	Sand, 80 per cent	54.2	19.3	50	20
	Gravel, 20 per cent Contains the same to 69 feet; then gravel gradually increases to 40 per cent. at 64 feet, and 65 per cent. at 70 feet.	.....	.....	8	1⅞″
6	Coarse gray sand Grows finer from 76 feet to 82 feet.	73.5	10.0	50	>20
6 A	Pudding-stone in No. 6 broken by pump	82.0	.....	.....	.....
7	Sand, 55 per cent	83.5	13.5	40	20
	Gravel, 45 per cent Gravel decreasing from 86 feet to 20 per cent. at 89 feet; then increasing to 70 per cent. at 92 feet; then decreasing from 94 feet to clear sand at 97 feet. Large amount of fine material.	.....	.....	5	2¼″
8	Sand Dark gray, gradation from No. 7; gradually growing finer to 100.2 feet, bottom.	97.0	3.2	75	25

Respectfully submitted.

E. H. WILSON,
Assistant, in charge.

Maj. CHARLES R. SUTER,
Corps of Engineers, U. S. A.

REPORT OF J. W. NIER, ASSISTANT ENGINEER, TO MAJ. CHARLES R. SUTER, UPON THE CONSTRUCTION OF A BORING APPARATUS.

KANSAS CITY, MO., *December* 22, 1879.

MAJOR: I have the honor of submitting the following, together with accompanying tracings of tools, &c., as my report on the boring apparatus designed and constructed under your direction.

This apparatus was made for the express purpose of making such borings along the Mississippi River as would give the exact location of the strata forming the banks of the river, and the securing of samples of the material taken therefrom. Previous experience in making a series of borings on the Missouri River showed fully the necessity of making all tools and appliances of great strength, and so simple in detail that they could be repaired in the field in case of accident, and avoid delays and consequent loss of time when the party was remote from a workshop.

The method of working consisted simply in forcing, either by driving or twisting, a wrought-iron pipe, three inches in diameter, into the ground in a vertical direction, and removing the core by means of pumps, drills, and augers, until the external resistance due to friction on the pipe became so great as to stop further progress. Samples of each change of stratum are preserved and the depth from the surface is noted. By the use of a single pipe the depth of one hundred and thirty or forty feet is readily attained, when a second pipe of less diameter is inserted in the large one and lowered to the bottom, and driving or twisting is commenced, and the method of working is the same as before. To more fully explain the methods of operating, a brief description of tools and their use will be given. The derrick used was of the tripod style, being nearly 30 feet in height, with a strong head or cap surmounted by a galvanized iron guide pipe, 20 feet in height, made in two sections and maintained in position by guy ropes. Two triangular platforms were bolted to the legs of the derrick, to accommodate the men that handled the pumps and rods. The pipe used was what is known as the best quality of heavy wrought-iron "well tubing," being 3 and 2 inches in diameter inside, and three-eighths and five-sixteenth inches in thickness respectively, and in lengths of 10 feet. These lengths were screwed together, making the exterior and interior surfaces continuous cylinders, avoiding irregularities that offer resistance to the sinking of pipes or the working of tools on the inside, of nearly the full size of the same. It is quite essential that the pipes be very smooth on the outside, experience having proved that the smoother the pipe the more readily it is sunk. On the bottom lengths of both sizes of pipe steel shoes are screwed. These have a sharp cutting edge, and at the mouth are a trifle larger in diameter than the exterior of the pipe upon which they are screwed. The increase of diameter to the shoe over that of the pipe is given, that in passing through logs or heavy material the shoe will cut a larger hole than the pipe, and preventing resistance to a large extent in further sinking or drawing the same. On the tracings they are shown in two styles, the improved being somewhat stronger and less liable to chip when striking bowlders than the other.

Sinking the pipes is accomplished by two methods, viz, by driving and twisting. By twisting progress is the more rapid, and sinking should in all cases be continued by this method as long as possible, as a single blow from the maul causes the material to adhere more closely to, and prevents the pipes being turned afterwards. Sinking by twisting is the best, also, as the wear and tear on the pipes is scarcely to be taken into account, while by hard driving its deterioration is to be noticed in a short time. Common gas-pipe tongs are used for twisting, jointing, or unjointing the different sections of pipe. Driving is done by bolting a clamp composed of steel staves and collars upon the pipe and resting the driving collar upon the ends of the staves, and striking thereon with the wooden maul or driver, as shown on tracing. The clamp used is very much like the common "friction coupling," consisting of six file-faced tempered steel staves, wedge-shaped in form, and held in position by two collars which, when drawn toward each other by means of bolts, force the staves against the pipe with great pressure, and prevent sliding or slipping of the clamp when struck a heavy blow with the maul. The driving collar, although appearing unnecessarily heavy, is made so to avoid its being distorted under hard and uneven pounding on its upper surface, as the resistance below from the staves on the clamp is applied to a narrow ring on its under surface. The collar is made of steel to give it stiffness. Mauls of different woods have been tried, and black locust or coffee bean wood is the best, and either can be had at any place in the river bottoms. Oak has been used, but it is not good, as it batters up badly when wet.

The weight of mauls used was from 80 to 100 pounds, and they were usually handled by three men, the fall or stroke of the maul being about two feet. A hole is bored lengthwise through the maul, of sufficient size to just pass the pipe through, the pipe acting as a guide that the blow may fall square upon the collar. In driving pipe the best results are obtained when the men act in unison and the blows are given in quick succession. Removing the core and securing samples is a branch of the work

requiring caution and judgment. The pipe is always kept full of water, to insure that water and the finer portions of the material composing the stratum in which they are working be not drawn in at the bottom by the action of the tools, thus preventing the true nature of the stratum from being definitely ascertained. This precaution prevents also, to a large extent, the danger of a rush of quicksand into and filling up of the pipes, and the consequent labor of removing the same, which must be done before the pipe can be sunk further. At all times it is an advantage to keep the pumps working as near the bottom as possible, to prevent too long a core and the travel of the same when sinking. Should the core be allowed to travel, thin strata might be passed through without its being known, and samples lost. Removing the core and securing samples requires the use of pumps, drills, &c.

The pumps used were the common "sand pump" and the "gravel pump," a modification of it. These tools are probably the most efficient that are employed to remove a core of fine material in the presence of water. Of these probably the best is the "gravel pump," which feeds more rapidly and works best in solid or compact sand and gravel. Both are made of a piece of boiler tubing, from three to five feet in length, and have a metal-capped leather valve near the bottom. These pumps are nearly the size of the pipe inside which they are used, and are handled by a pump-rod or stem raised and lowered by a wire rope and reel. The pump rod or stem is made of three-quarter inch gas-pipe, two ordinary lengths comprising a section which are screwed together. These sections are keyed together, and in lowering or taken up are taken from or left on the upper platform, where the bottom of each section rests while the upper portion is steaded by the guide-pipe resting on the head or cap of the derrick, which shields them from the wind and avoids excessive vibration. To expedite the work of raising such a weight of rods and pump a small iron reel is bolted on the leg of the derrick, a small wire rope passing from it over a sheave set in the leg near the head, then over a small sheave on the upper platform into the pipe. A small iron stirrup is attached to the pump tongue and fastened to the wire rope. The operation is then to turn on the reel until a joint of the pump-rod is at the top platform, when another section is put on or one taken off, as the case may require. The exact distance of the pump from the surface is known by the gradation of the pump-rod into feet and tenths. After the completion of the boring, the drawing of the pipes from such great depths, when the weight, together with the continuous resistance of friction from the surface to the bottom of the pipe, makes a total resistance to nearly equal the ultimate resistance of the pipe at the joints to tension. Withdrawing the pipe is done by a system of compound levers. A framework, consisting of two oak planks solidly bolted together, has two resistance pieces fastened on the edge of the plank, upon which rests a wedge clutch consisting of a wrought-iron collar and steel wedge. As the lever is lowered the clutch slides along the pipe, and the wedges catch when the motion is reversed, the whole system only moving upward when the pipe yields. The lever of plank has one end resting upon a fulcrum fixed, and under the other end a second lever is placed, the comparative motion of the pipe and second lever being as one is to thirty.

Differential blocks have been used to assist in pulling pipe, but are not strong enough, and are only an auxiliary to the levers which raise a large proportion of the weight. When blocks are used they are suspended from the head of the derrick, and are hooked on a cap, screwed on the head of the pipe. In all cases a steady pull is required to start pipe so firmly held by material in which it is buried. A great strain is put upon it, causing considerable spring in the frame lever, which rapidly takes advantage of a sudden yielding of the pipe, and causes it to move more rapidly than would otherwise be the case, as moving occurs in jerks. In addition to tools previously mentioned are to be found the rock tool or breaker, auger, gouge, and "pod," or "sample point." The pod or sample point had been in use in making borings on the Missouri River, and was taken along for trial on the Mississippi River with hopes that it might add materially to the equipment of the party, and add to the depths attained by the pipe. It is designed to be forced into the ground, and when a new stratum is entered to give it a few turns to open the cup, and then withdraw it. The process is to be repeated as often as changes occur. The tool did not meet expectation, for it could not be forced a foot beyond the pipe, neither could changes of material be determined by the manner in which the tool worked or by the sound emitted. The rock tool, auger, and gouge were never used, the necessities of the work never having required them, and they are therefore superfluous. The pebble tongs are for removing large pebbles from the pipes that would not enter the pump valve, also to remove pumps or tools that might by accident become detached and left at the bottom. In addition to the previously mentioned special tools for making borings, a complement of tools was taken along to make light repairs in the field.

To Mr. E. H. Wilson, who acted as my assistant in making up this apparatus, I am specially indebted for earnest co-operation.

Respectfully submitted.

J. W. NIER,
Assistant Engineer.

CHARLES R. SUTER,
Major of Engineers, U. S. A.

APPENDIX K.

REPORT OF ASSISTANT ROBERT E. M'MATH UPON THE MUTUAL RELATIONS OF RIVER SECTIONS UNDER DIFFERENT CONDITIONS OF DISCHARGE AND CURVATURE.

SAINT LOUIS, *November* 20, 1881.

SIR: Much of the following paper has been before the Commission in connection with a special topic, which is embraced by the title above, the effect upon and within a river-bed of a permanent increase of volume.

A considerable part of what was then said is equally applicable to the more general case of a variable discharge, and it has been suggested to me that the matter will be of more value when divested of its specific application.

When treated generally it is a pertinent addendum to a study of sections.

It will perhaps add to the interest in a discussion, which rests largely upon abstract reasoning from supposed conditions, to present a few of the facts, for which the discussion aims to develop a reason.

I therefore present the data which first suggested to me the idea that relative changes within the section, and between related sections, were a necessary consequence of varying volume, in a silt-conveying stream traversing a bed composed of its own alluvion.

The facts cited below were obtained by special surveys made in 1878 and '79, under the direction of Col. J. H. Simpson, acting under the order of the Chief of Engineers, and according to a resolution of a Board of Engineers convened by special order No. 71 of the Series 1878.

The data and reports upon those surveys having been put at the service of the Commission, I suppose there can be no impropriety in my using them here.

The following table shows the change of mean depth in a series of sections in front of the city of Saint Louis. The river here has been canalized, and for more than a mile above the upper section flows between paved banks. The sections compared are reduced to a common stage of 9.5 feet above the low water of 1863. The sections were at an average interval of 350 feet, being prolongations of the streets named.

Designation of section.	Width.	Change of mean depth.		
		Sept. 17 to Mar. 31.	Mar. 31 to May 10.	Sept. 17 to May 10.
	Feet.	*Feet.*	*Feet.*	*Feet.*
Pine street	1,604	—1.61	—1.41	—3.02
Chestnut street	1,609	—3.45	—0.35	—3.80
Market street	1,650	—2.00	—0.61	—2.61
Walnut street	1,744	—0.65	—1.62	—2.27
Elm street	1,815	—2.26	—2.23	—4.49
Myrtle street	1,885	—2.91	—1.40	—4.31
Spruce street	1,942	—2.27	—2.32	—4.59
Almond street	1,982	—1.49	—1.46	—2.95
Poplar street	2,032	—2.17	—0.26	—2.43
Plum street	2,033	—1.69	—0.63	—2.32
Cedar street	1,958	—2.96	+0.17	—2.79
Mulberry street	1,893	—0.86	—3.06	—3.92
Pittsburg Dike	1,547	—2.02	—5.18	—7.20
Sum	.....	—26.34	—20.36	—46.70
Mean	.....	—2.02	—1.56	—3.59

This apparently progressive fill in an improved part of the river, whose width many have feared may prove inadequate to pass the waters of great floods, called for close study.

A series of sections near Brickey's Mill, about 40 miles below Saint Louis, eighteen in number at intervals of 1,000 feet, furnished the following:

[d. m. d. =difference of mean depth.]

Section.	Nov. 12.		Apr. 5.		Apr. 29.		May 20.		June 5.		Sum of d. m. d.		
	Width.	d. m. d.	Width.	d. m. d.	Width.	d. m. d.	Width.	d. m. d.	Width.	d. m. d.	Apr. 29.	May 20.	June 5.
	Feet.	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*
1	1,255	.....	1,255	-0.19	1,165	+2.68	1,165	+1.61	1,190	—3.10	+2.49	4.11	+1.01
2	1,505	.....	1,585	—2.70	1,185	+6.71	1,200	—0.22	1,185	+0.61	+4.01	3.79	+4.40
3	1,635	.....	1,635	—0.30	1,605	+0.85	1,605	+0.17	1,605	+1.08	+0.55	0.72	+1.80
4	1,625	.....	1,625	—0.90	1,565	+0.40	1,565	—0.56	1,595	+3.09	—0.50	1.16	+1.93
5	1,630	.....	1,630	—1.94	1,600	+2.16	1,600	—2.21	1,600	+2.57	+0.22	—1.99	+0.58
6	1,570	.....	1,570	—0.52	1,570	—0.98	1,570	+1.28	1,565	+0.42	—1.50	—0.22	+0.20
7	1,535	.....	1,535	—0.66	1,515	—4.35	1,510	+3.25	1,515	+2.39	—5.01	—1.76	+0.63
8	1,445	.....	1,445	—0.84	1,395	—1.14	1,395	—2.50	1,400	+3.03	—1.98	—4.48	—1.45
9	1,540	.....	1,540	+0.84	1,540	—3.02	1,540	—0.18	1,520	+1.38	—2.18	—2.36	—0.98
10	1,715	.....	1,715	+0.82	1,695	—2.88	1,695	+0.37	1,695	+1.29	—2.06	—1.69	—0.40
11	1,845	.....	1,860	—0.69	1,803	—0.97	1,808	—1.87	1,810	+2.44	—1.66	—3.53	—1.09
12	2,026	.....	1,990	+0.21	1,985	—1.75	1,965	—1.52	1,985	+0.76	—1.54	—3.06	—2.30
13	2,260	.....	2,260	—0.06	2,215	—1.22	2,195	+0.41	2,175	—1.22	—1.16	—0.75	—1.97
14	2,600	.....	2,600	+0.38	2,555	—1.68	2,555	+1.61	2,555	—0.85	—1.30	+0.31	—0.54
15	2,975	.....	2,930	+0.74	2,910	—1.30	2,900	+0.24	2,905	+0.03	—0.56	—0.32	—0.29
16	3,215	.....	3,273	+1.39	3,205	—2.30	3,205	+0.88	3,200	—0.22	—0.91	—0.03	—0.25
17	3,690	.....	3,690	+1.39	3,685	—1 97	3,685	+0.11	3,680	+0.40	—0.58	—0.47	—0.07
18	3,954	.....	3,954	+1.44	3,945	—1.45	3,948	+0.20	3,945	+0.17	—0.01	—0.21	—0.04

We may say from the evidence of this table that the changes in the sections at the extremes of the series tend to have opposite signs. This tendency is marked as to sections 1 to 5 and 14 to 18.

The columns of widths show that from sections 1 to 8 the width varied moderately and irregularly, but from 9 to 18 there was a steady increase of width. This is sufficient to suggest that whatever be the causes which produce change at the bottom, their effect in a narrow section of the river is the opposite of that in a related wide section, for:

November 12 to April 5 river fell 6 feet and rose 8.50 feet; sections 1 to 8 filled 0.93 foot, and 14 to 18 scoured 1.07 feet.

April 5 to April 29 a further rise of 5.75 feet, succeeded by a fall of 4.90 feet; sections 1 to 5 scoured 2.56 feet, and 6 to 18 filled 1.92 feet.

April 29 to May 20 river fell 1.1 feet; sections 1 to 12 filled 0.20 foot, 13 to 18 scoured 0.51 foot.

May 20 to June 5 river rose 4.5 feet; sections 1 to 12 scoured 1.33 feet, and 13 to 18 filled 0.28 foot.*

Passing from specific facts to more general, it is a matter of common observation that an early effect of a rise is to fill up pre-existing channels in shoal places, and that after a high stage the channel depth is much less than the stage of water as read from a permanent gauge would lead one to expect.†

The universality of these facts is proof that the cause is general, and, if general, discoverable.

The facts recited do not bring into view the change in channel depth.

The fills and scours noted were far from being uniformly distributed; the figures given are the algebraic sum of fills and scours within any section or series of sections. One can then readily understand that a given change of mean depth may be coincident with a change of channel depth having the opposite sign. Some confusion in discussions of river phenomena has resulted from failure to recognize this probability.

A very common conception of a river bar is a simple swell, rising gradually to a tolerably well defined crest, and then falling off rapidly to a considerable depth. To one holding such an idea the suggestion of a change of channel depth by fill would be represented by the longitudinal profile of Fig. 4, the shaded line representing the original bar, the dotted the effect of a fill. If it be understood that the navigable channel is through a depression in the crest of the swell, it will be plain that any filling of that depression diminishes navigable depth as effectually as if it filled the entire section equally.

* Other facts of similar character may be found in the report of Mr. W. H. Powless, assistant engineer, dated March 23, 1881. (See Appendix D.)

† Pilot I. H. Baldwin pulished a statement over his signature, that when the river had fallen to bank full stage after the flood of 1844 he with difficulty found a 9-foot channel between Saint Louis and the Ohio. Bank full corresponds to the "danger line" of the signal service, 30 feet on the Saint Louis gauge.

Fig. 5 illustrates how the local fill limited by the dotted line may diminish the channel depth more, relatively, than the much greater deposit indicated by the broken line. One can, on the conception of a simple bar, understand that this would be the case, but could hardly perceive why such fill should occur, and especially attend a rising stage, when the velocity as well as volume is commonly believed to be increasing. Some, accepting the evidence that fill during high stage is a fact, argue that it must attend the slackening current at the turn of stage and decline.

Fig. 4.

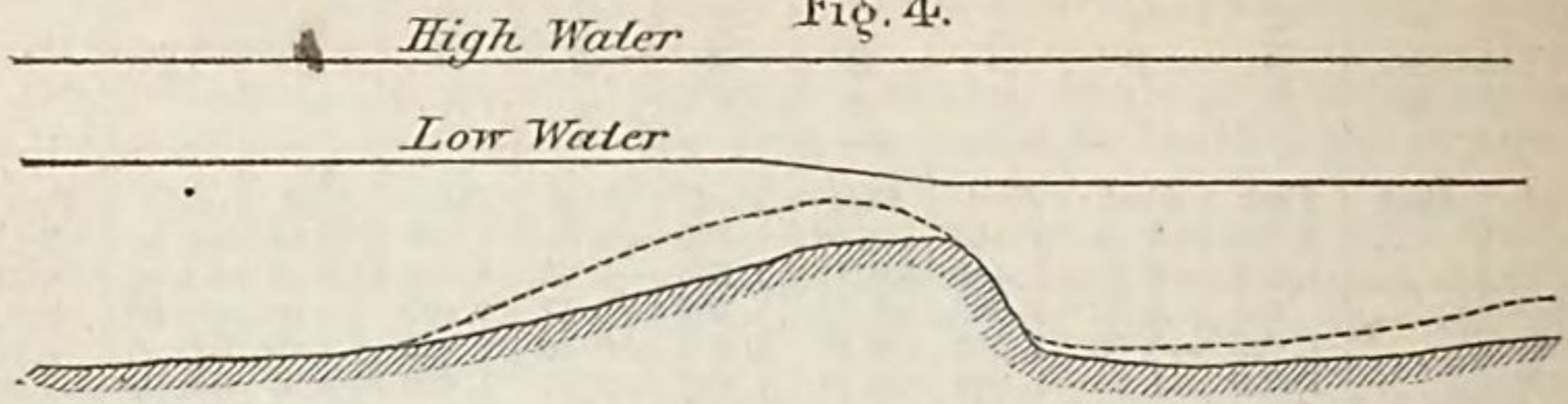
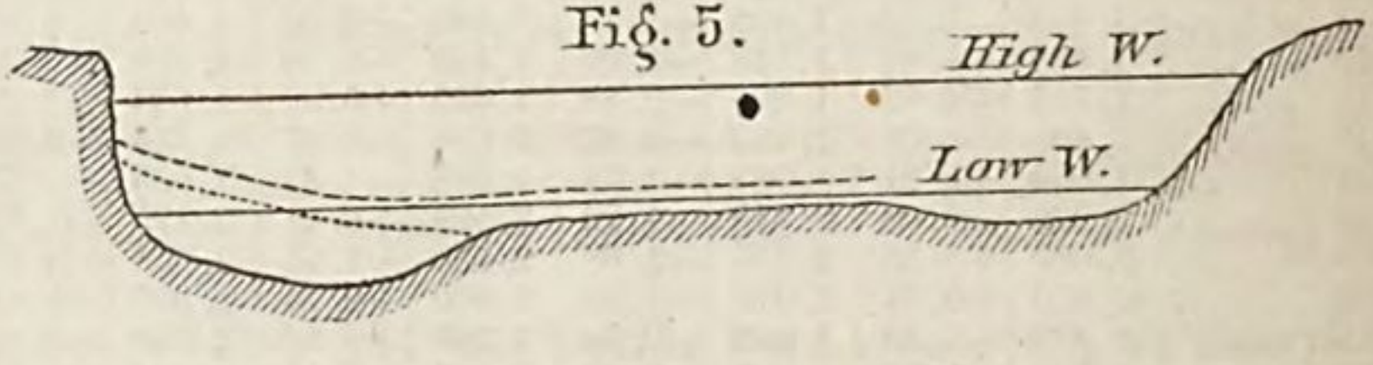


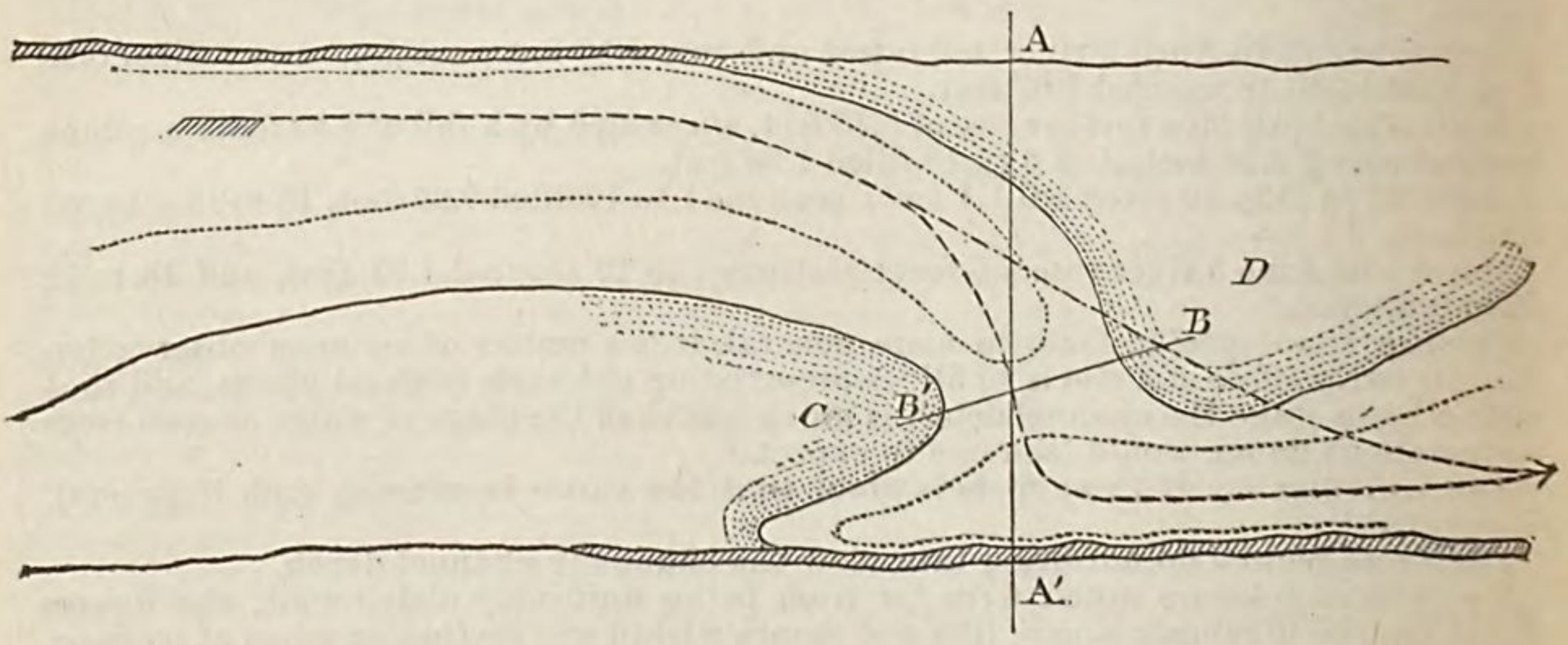
Fig. 5.



Others, skeptically inclined, may think the facts presented exceptional. For the benefit of these two classes it is well to present an argument from geometrical and dynamical relations, which puts the phenomena noted into the category of *must be.*

To illustrate how a movement of material small in quantity and moderate in distance traversed, can materially diminish channel depth, let Fig. 6 represent a low-stage channel in a straight and wide reach of river. (It is an actual case slightly generalized by omission of small patches of bar.)

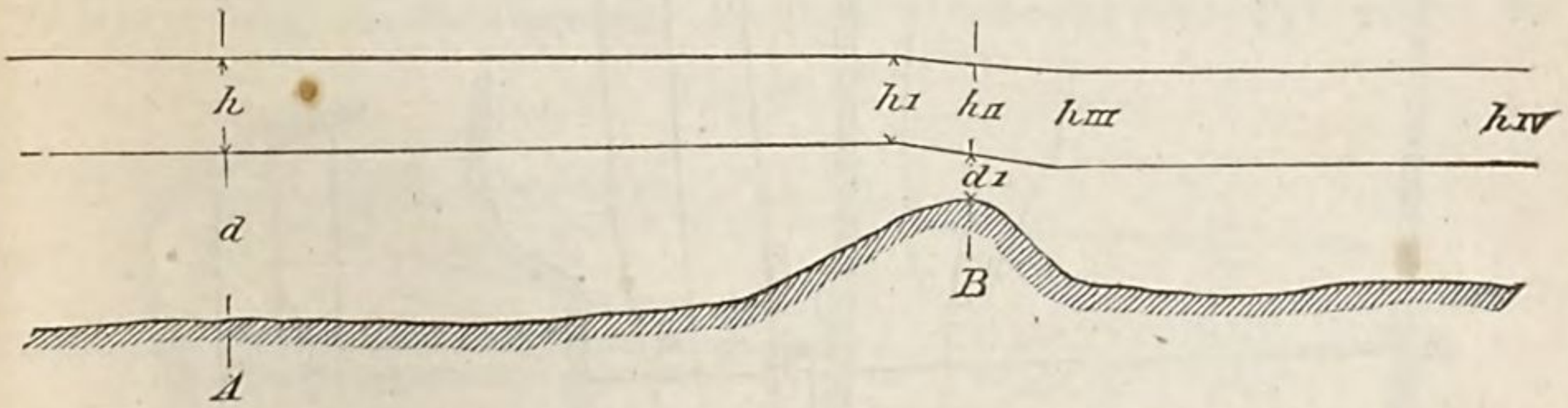
Fig. 6.



If, from any cause, the lower point of the upper bar C moves down stream more rapidly than the whole bar D, the crossing will be filled and the channel crowded over the shoulder of the lower bar, where it will have less depth than in its former position. It is quite evident that, to obtain a true section at the point of least channel depth, it must be taken on the line B B′, and that a mid-stage section would be at right angles to the channel line crossing the shoulder of the lower bar, while the line A A′ would be the characteristic section at bank-full stage. It is obvious that the control of the channel must change during the rise from low water to bank-full stage, from the secondary causes which regulate the relations of the reefs C and D to each other, to the more general cause which determines the existence of a bar or deposit in the stretch of river represented on sketch. Or, to put the difference more strongly, the low-water stream of small volume flowing in the tortuous channel defined by the bar outlines is a different river from the mighty flood whose bed is defined by the high-water banks.

To keep a specific point of discussion in view, I will consider the effect of adding a volume that will raise the surface one foot as a mean for a section of considerable length. This foot is added to the depths as a mean, but gives no intimation as to the result upon the navigable depth, which is little concerned with any question but that of the depth upon the shoalest bar crest in the section of river. At the outset we meet the difficulty that we are endeavoring to measure the increment of one of three variables which have a reciprocal relation, but are not entirely dependent upon each other. We have the original state, $Q=d.\ w.\ v.=A.\ v.$ of which all the factors and combinations are variable, V having an inverse ratio to A, or the product $d.\ w.$ and a direct relation to the factor $d.$ The new state is $Q+q=(d+h)\ w.\ v_{,}=A'\ v_{,}$.

Fig. 7.



It will be seen that h cannot have a fixed value unless the product $d\ w$ be a constant, that is, the stream have a uniform cross-section, in which case v becomes constant also. But v has a direct relation to slope, an independent variable, which, as measured between extremes, may have a mean value that may be used in general discussions, but the essential thing of our inquiry depends upon its maximum and local variations.

It will do no violence to the subject to assume a completely regulated channel at the outset of the investigation. Therefofe, assuming a rectangular section and parallel banks, we have in the expression for the volume $Q=Av=d.\ w.\ v$, but two variables, d, and v.

If Fig. 7 represent the longitudinal profile of a channel passing the volume Q, we will have the variables d and v varying together in an inverse sense, because the product $d\ v$ must, under the conditions, be equal to the constant $\frac{Q}{w}$. Taking the general formula,* $v=c\sqrt{rs}$, whence $s=\frac{v^2}{c^2r}$, it is apparent that an uniform slope is impossible in a stream of irregular depth, and the surface may be represented by a series of planes with varying inclination, as in the figure. If a volume be added, sufficient to increase the depth in the deep part at A by h, the problem is to determine what will be the relation of the increment to depth, h', at the shoal?

If we allow that velocities at a given point vary as the square roots of the depths, the velocity at A, before and after increase of volume, will be in the ratio.

$$\frac{V}{V'}=\frac{\sqrt{d}}{\sqrt{d+h,}} \text{ and at B } \frac{V_i}{V_i'}=\frac{\sqrt{d_i}}{\sqrt{d_i+h_{ii}}}$$

whence it appears that at first the velocities of the two sections are in the ratio

$$\frac{V}{V_i}=\frac{\sqrt{d}}{\sqrt{d_i}} \text{ and after increase } \frac{V'}{V_i'}=\frac{\sqrt{d+h}}{\sqrt{d_i+h_{ii}}}$$

When h becomes a sensible quantity, it is apparent that the ratio

$$\frac{\sqrt{d}}{\sqrt{d_i}} \text{ is greater than } \frac{\sqrt{d+h}}{\sqrt{d_i+h_{ii}}} \text{ consequently } \frac{V}{V_i}>\frac{V'}{V_i'}$$

and the velocities at the two sections will be more nearly equal with the greater volume. Since slope attends velocity in a direct ratio, it is certain that an equalization of slopes is a first consequence of increase of volume. But since, in the case under consideration, areas can never be equal, the velocity and local slope at the shoaler section must always be greater than at the deeper.

Having proven that increase of volume, in a rectangular channel of uniform width, causes equalization of slope, it follows that $h>h_i$ and h_{iii} and $>h_{iv}$ because flat slopes become steeper and steep slopes flatter. Since h is by hypothesis the mean rise of surface over a section of considerable length, it follows that $h_{iii}>h$. The navigable depth before increase was d_i, after increase it is d_i+h_{ii} and h_{ii} has an intermediate value between h_i and h_{iii}. From the fact that the length of the plane of greater descent at

* This use of the Chezy formula is not an indorsement of it as practical, nor of the terms composing it as true expressions of hydraulic relations.

the shoal increases with the stage, the change of gradient moves up stream, whereas the crest of shoal remains stationary, the probabilities favor that $h_{ii} > \frac{h_i + h_{iii}}{2}$ while it is certain that being a mean $h = \frac{h_i + h_{iii}}{2}$ therefore there is little risk of error in assuming that a given increase of mean depth will afford an equal increase of navigable depth in a channel *completely regulated and with an unyeilding bed.*

Dropping the rigid conditions of a regulated stream, and allowing local variations of width as well as slope and depth, the effect of increase of volume may be traced, if we assume that the differences of h, at the various points compared are small enough

Fig. 8.

Fig. 11.

Fig. 9.

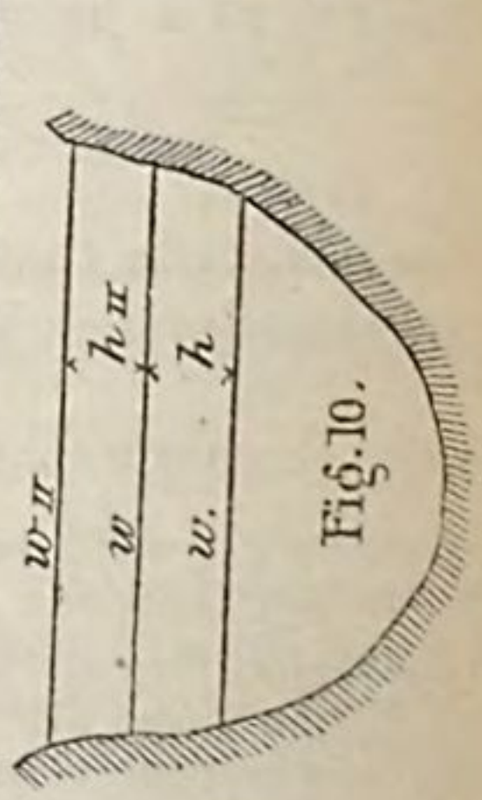


Fig. 10.

to be neglected in computing the area of cross-sections. This assumption will be justified if it be kept in mind that the areas of the compared sections are equal at some particular stage between the extremes to be studied and that the differences $(h'-h_i)$ must be small as compared with total depths.

The sections represented by Figs. 10 and 11 are the means for the distances indicated by the brackets of Fig. 8, in order to eliminate minor irregularities of area, which do not affect the flow of the stream. The slopes considered are also the means for the same distances.

By hypothesis, the area of Fig. 10 below the line a–a_i is equal to the area of Fig. 11 below the line b–b_i. Areas being equal, velocities at the two sections must be equal also, and if velocities are equal, the local slopes must be very nearly equal also (strictly the slope to produce equality of velocity must be slightly greater at the section of less mean depth). The intermidiate line of Fig. 9 is the line of practically uniform slope, which corresponds to equal arears of cross-section. If the discharge be diminished, and the surface lowered by h, and h_i, respectively, the reduced areas will be

$$A - \frac{w + w_i}{2} h \text{ and } A - \frac{W + W_i}{2} h_i.$$ Since h–h_i is small in comparison with

$$\frac{W + W}{2} - \frac{w + w}{2}$$ the new idea $$A - \frac{w + w_i}{2} h < A - \frac{W + W_i}{2} h_i.$$ In the new state the shoal section becomes the smaller; therefore, to pass a given volume a velocity greater than at the larger section is required. Resistance of bed being relatively increased, the increase of velocity can only be obtained by greater head or slope, wherefore, $h_i > h$, and the surface slope is as represented by the lower line of Fig. 9, which represents the distribution of slopes at the low stage actually found in natural streams, the fall being mostly concentrated at the shoals. Reversing the argument, it is certain that if the lower line be the initial stage, and an increase of volume occur, the increment h_i will be greater than h. *Therefore, in an unregulated river, with unchanging bed, the mean elevation of the surface caused by increase of volume will be somewhat less than the increase of navigable depth.*

Fig. 12.

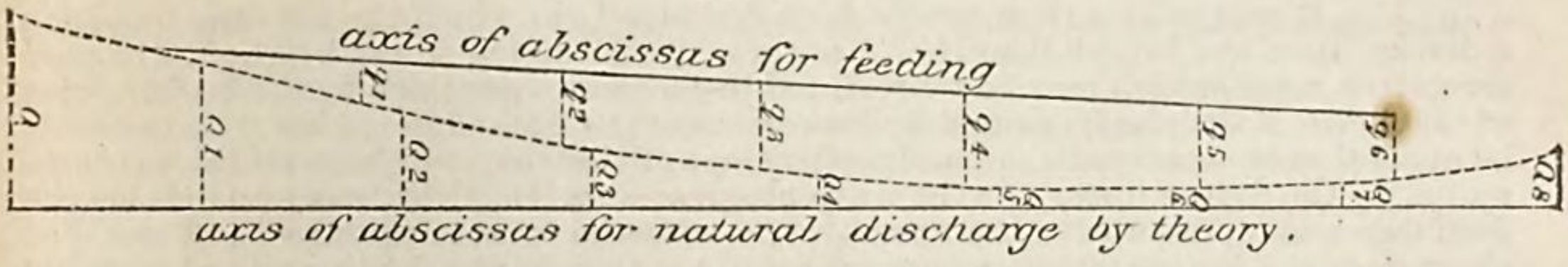
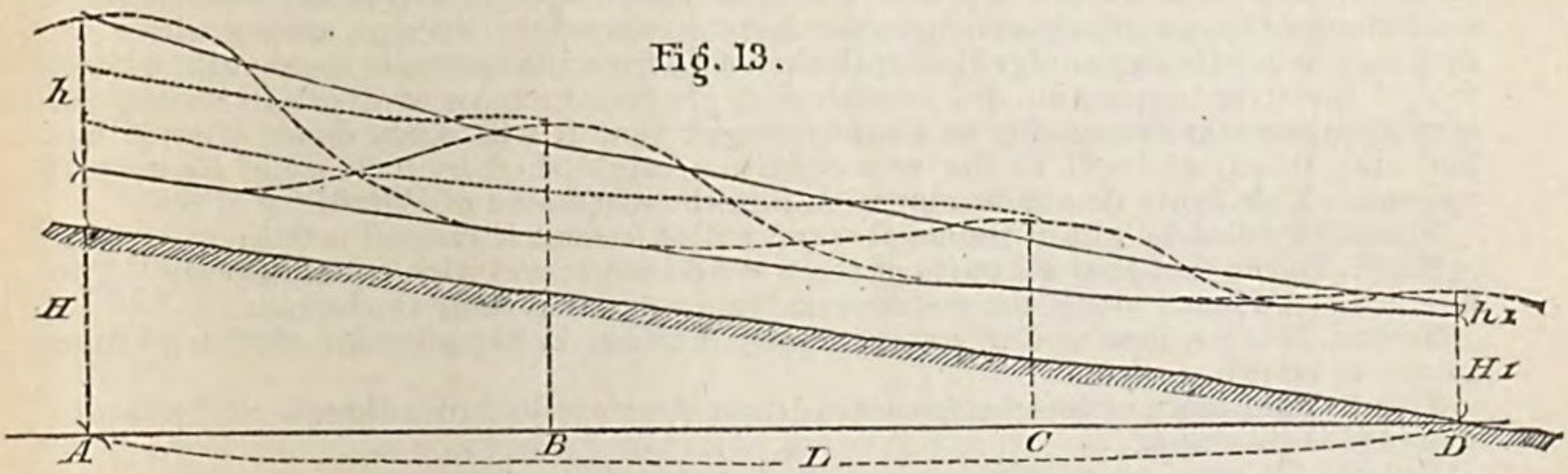


Fig. 13.



Returning to the stage of equal area, a similar course of reasoning will prove that if the volume be increased the increment of depth h_{iii} will be $> h_{ii}$, and the distribution of slope will be, as indicated by the upper line of Fig. 9, flat over the shoal and steeper in the narrow section.

Wherefore the general law is established that:

In a river of varying width and unchanging bed, the positions of the sections of greatest and least velocity, occurring within a given length of river, interchange as the river rises above or falls below a particular stage at which the areas of the cross-sections compared are equal.

Also an interchange of position of greatest and least slope will attend the change of velocity, but will not be coincident in time; the change of slope following that of velocity on the rise and preceding it on the decline.

The local variations between extremes of slope and velocity will be greatest at the section where the greatest variations of area occur; that is, at the wide section.

Sections are fairly comparable when the change of width is gradual from one to the other.

The time of interchange is determined by fulfillment of the condition of equal areas at the compared sections, which is a local event. The dates of interchange will not be coincident at different localities.

If we release the arbitrary condition of unchanging bed, the local increase and decrease of velocity will certainly affect the section. For a discussion including insta-

bility of bed, the foregoing is a preliminary step, but we are not as yet prepared to take up the subject, for other preparatory steps must precede. Among them is to obtain a clear understanding of the distinction between permanent increase of volume and the effect of an ordinary increase of the discharge by a like quantity.

An ideal reservoir will be introduced for illustration.

Under the operation of a reservoir regulation, the stream would be allowed to take its ordinary course until approaching the stage of obstructed navigation, when the reservoir would be drawn upon.

The feeding may be supposed to be conducted upon one of two alternative plans. The regulation according to a fixed scale of discharge, either constant or represented by a curve intended to be the complement of the theoretical curve of natural volume.

Fig. 12 is an illustration of this plan:

The other alternative is to adjust the artificial flow to the fluctuations of the natural discharge so as to maintain a constant volume. This is to make the common curve of Fig. 12 a waving line instead of a sweeping curve.

Theoretically the maintenance of a constant volume is preferable, and being more simple we will make it the base of the discussion.

Let Fig. 13 represent a river profile for a distance L, in which the low-water slope is a descent from the height H to H_1. A natural rise occurring to the height h, will pass along as a wave, which may be represented in successive positions by the broken lines of the figure, if the rise be caused by local rains over a limited area; but if the rainfall be general over an extended area, the after slope of the wave will be modified, as represented by the dotted lines. As the wave progresses its length increases and its height diminishes as represented. If a vessel travel with the crest of the wave and measure channel depth we can readily comprehend that, though the depth at the low stage increased gradually with the distance, as shown by the relation of the shaded line to low-water, the depth at top of rise may diminish with the distance. But if the volume by which the height h is obtained be maintained indefinitely, the front slope of the rise will reach the end of the section, and leave behind it the permanent rise h to h_1, traced by the full line.

The depths measured to the shaded line appear to diminish with distance, and it might hastily be inferred that the value of the artifical maintenance of volume diminished with distance also. But it should be remembered that the permanent maintenance of the volume at a higher standard is a change in one of the essential conditions of the stream; and we can best arrive at what modifications will follow such permanent change by considering the general facts presented by streams, among which we find that as a rule the navigable depth increases from the source to the mouth, wherefore, if the river in question did furnish such gradual increase of depth in its natural condition, we may reasonably and safely expect that it will again do so, after it has had time to adjust itself to the new condition, established by increase of its normal volume. This again demands admission into the discussion of instability of bed.

The diminished height of the flood wave with distance traversed is due:

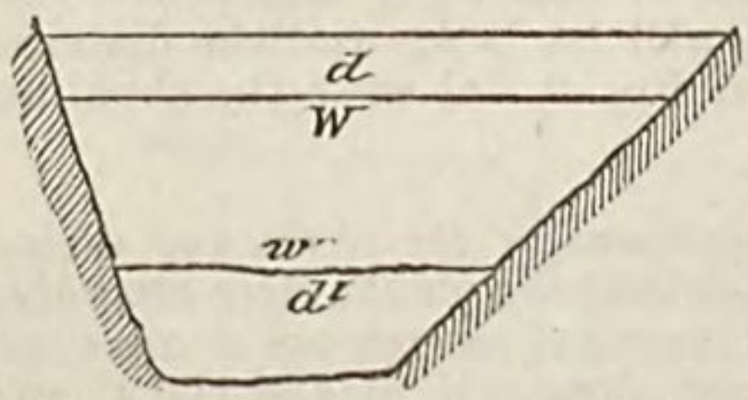
First. To the fact that all parts of the wave do not travel with equal velocity. The forward slope being steep, the waters in advance outstrip those in the rear.

Second. To the fact that rivers generally increase in capacity for discharge from source to mouth.

Third. That more or less water escapes from the river bed into sloughs and swamps where it is retained.

Fourth. To some extent the banks absorb water.

Fig. 14.



Fifth. Increased superficies involve a proportionate increase of evaporation.

The first two named constitute what is called "channel filling," the second two are the reservoir action of the immediate valley, acting by surface overflow or subsurface saturation. Since the water detained by all four occasions of temporary loss is subsequently discharged, except as diminished by the fifth cause of loss, the result is equalization of volume, in the interest of increased discharge during subsequent lower stages, which assimilates to artificial reservoir feeding.

The essential idea of reservoir feeding is that it follows a high stage and maintains the volume at a fixed standard or diminishes the rate of decrease, It consequently is very unlike an attempt to produce a rise, and instead of being likened to what occurs at the front slope of a rise, its proper likeness will be found in the rear.

The channel in width and length is already full up to and beyond the level reservoir feeding can reach. The side reservoirs, swamps, and saturated soils are also full, and will contribute rather than absorb. Lastly, the area of evaporation will be increased in very small proportion over the natural area at low stages, by any amount of feeding that can be attained. It follows that if the low-water discharge near the sources of a stream is increased by a given quantity, the discharge at the mouth of the stream will be increased by substantially the same quantity. But if the stream receives tributa-

ries *en route*, the proportionate increase of volume will be less at the mouth than at the source.

If we suppose the slope of the stream to be so distributed as to maintain a uniform velocity V from source to mouth, it follows that the addition of any volume q will add a certain area $a = \frac{q}{v}$ to the cross-section throughout the course, if we neglect the slight variation of v which would result from increase of volume. Under natural conditions v is a variable quantity, and $\frac{q}{v}$ will be variable also, but a will always have a positive value.

If the bed and banks be stable, the increase of navigable depth at any point will be $d = \frac{a}{\frac{1}{2}(W+W_1)}$, the quotient of increase of area divided by the local width. But if bed and banks are unstable, the increase of navigable depth is, in the present state of the problem, indeterminate. Considering the banks stable and the cross-section a trapezoid, it is very evident, from a glance at Fig 14, that the quotient of a by the surface width is less than by the bottom width, $\frac{a}{W} < \frac{a}{w}$; wherefore the increase of navigable depth will be greater as a general rule under natural conditions, if the increase of area be obtained at the bottom than if at the surface, $d_, > d$. *That is, we may expect greater benefit to follow increase of normal volume in a stream whose bed can be scoured by the current than if the bed be unyielding.*

It will also be borne in mind that the feeding coming in the rear of the wave does not tend to change the direction of the currents or channel, but, on the contrary, to preserve the constancy of that direction. Here again inquiry is suggested concerning the probable result of an increased and more regular volume flowing in a constant direction upon the bed, if that bed be unstable.

The following will now be assumed to be uncontested facts:

1. That extended movements of sand and other material manifest themselves at the bottom of some streams, and the Mississippi is one of them.

2. That these movements are not simply of material along the bottom as a stream of sand, but the transverse and longitudinal profiles are influenced by the movements, which are not in mass, but by transfer of particles from rear to front of an advancing sand wave or reef.

3. A succession and combination of such waves or reefs constitutes a bar or shoal, which may present a certain fixity of position, though the material be constantly changing.

4. That the bars and shoals are increased in mass during floods and wasted during low stages.

5. That the amount by which the bars are increased in mass during flood is too great to allow the supposition that the bottom generally is raised to an equal degree, or any approximation to it, because such supposition would involve, either that the bed of the stream is being rapidly raised or else the solid matter discharged by the river must be manifold greater than the advance of deltas and other modes of estimate indicate.

6. That the movement of heavy reef forming material is by rolling along the bottom, or by an intermittent suspension, whereby the particles are alternately in a state of rest and motion. The period of motion being, for any individual particle, short compared to that of repose.

7. The motive power comes directly or indirectly from the motion of the stream, and the local movements will increase and diminish in some proportion to the local changes of velocity.

Fig. 15.

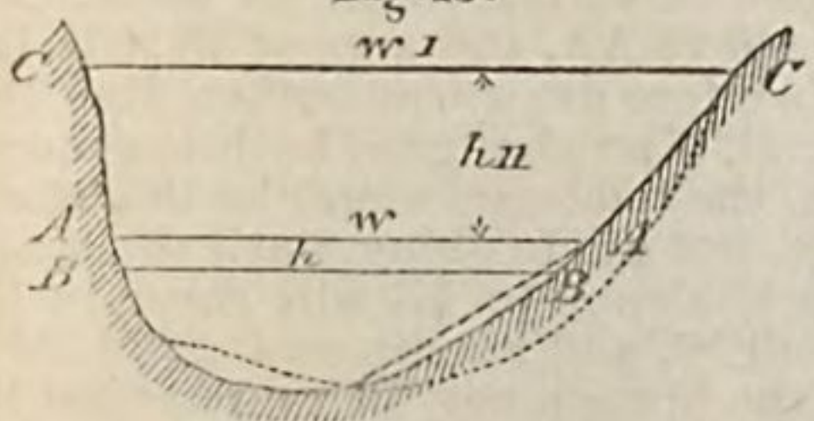
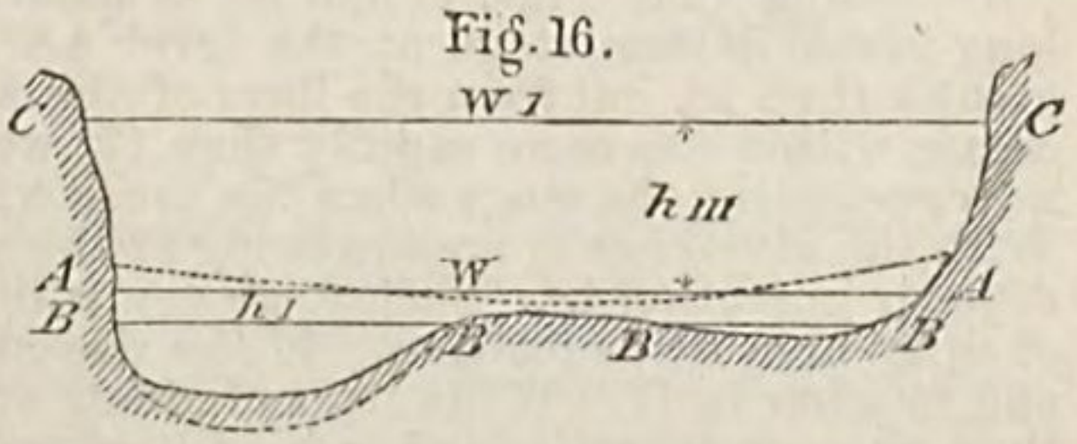


Fig. 16.



8. Material transported may, in part, be procured by the falling of eroded banks, but generally under intermittent motion it will be obtained within the wet section. The supply for extended periods being maintained by contributions of tributaries, material deposited must lie within the wet section. Consequently, changes in the area and form of wet section are inseparable from the movement of heavy material, unless

such movement be continuous; that is, constant in volume, but not necessarily identical in material.

The demonstration of changes of slope and velocity attending variations of volume, already given, depends upon the principle of permanent motion. "That the mean velocities in two transverse sections are to each other inversely as the areas of those sections."

Under the condition of permanent motion, the actual mean velocity may be either uniform or variable, the former being a supposable case, the latter the real. Nevertheless, it must be admitted that the tendency or effort of a mass moving with a variable velocity is toward uniformity.

Streams are commonly regarded as flowing in fixed channels, in which local resistances and irregularities occasion local variations in the velocity. If we imagine a perfectly flexible channel it must follow, from the influence of inertia that the state of uniform motion would be attained, and with it a constant area.

Passing to the ordinary condition of a mutable channel, it follows that the approximation to uniform motion will be closer, as the mobility of the material composing the bed increases.

I therefore resume the discussion of the *change of section arising from the variation of volume under the special conditions of variable width and unstable bed.*

If, in Figs. 15 and 16, the areas at the stage represented by the lines AA are equal, the consequence of a decline of stage to the lines BB, will be to render the areas unequal, and the greater velocity will be found in section, Fig. 16. But increased velocity carries increased power to act on the bed, consequently an enlargement of the section, Fig. 16, will follow. By parity of reasoning, the velocity in Fig. 15 being diminished, a decrease of area will ensue. The altered sections are represented by the broken lines of Figs. 15 and 16.

Since the change of area and velocity due to the decline h, in Fig. 16, if uncompensated is greater than that due to the decline h in Fig. 15, the compensating change of area will be much greater in the wide section than in the narrow. The artihmetical sum of the changes in the two sections cannot exceed the limit $Wh_{,}-wh$.

If on the other hand the stage rises from AA to CC, conditions of change opposite to those described above will prevail, and Fig. 16 be filled, and Fig. 15 be somewhat enlarged as indicated by the dotted lines. The sum of changes will have the limit $\frac{W+W_{,}}{2}h_{,,,}-\frac{w+w_{,}}{2}h_{,,}$ for by hypothesis the effort is toward maintenance of equal area.

These reasonings afford no clew to the changes of navigable depth, which may result from the changes of area. It is supposable that the fills and erosions may be so limited to the sides as to leave the bottom in the thalweg unchanged, as in Fig. 15. But when the changes are great it is scarcely possible that the low-water channel be preserved.

Having shown the alterations from a state of equilibrium to one of scour or fill, as the water falls below or rises above the stage of equal area, two questions suggest themselves concerning the stage of equal area. 1st. *Is it fixed or variable at a given locality?* 2d. *Does it have an actual existence within the range of rise and fall occurring within a given time, and within the limits of area variation found in a section of river of certain length?* Specific answers to these questions are matters of fact; general answers only can be given by theory.

The hypothesis of perfect mobility of bed allows attainment of uniform motion, or equality of areas at all sections, at all stages. Partial mobility of bed does not allow uniform motion as an actual existence, except as the result of a progressive tendency or effort for an infinite period. Therefore with the duration of particular stages for limited time, the adjustment must always be incomplete.

Supposing that Figs. 17 and 18, as shaded, represent the sections at the close of a long period of low stage at the level AA. The area of 17 must still be somewhat greater than 18, but from the form of the sections above AA, the area of 18 will increase with a rise more rapidly than 17; we may therefore draw the broken line BB as representing the stage when the areas will be equal, if no change of bottom occurs. With the difference of area existing at the stage AA, the tendency would be to a state of scour in section 18. Such tendency will continue, but diminishing, until the stage of equal area BB is reached. If the rise continue a tendency to fill will ensue in 18, and to scour in 17. If the rise culminate at the level CC, and remain on a stand for a time, the compensations of area will progress until the bottom may be represented by the dotted lines of the figures. The condition of equal area will not be attained, but will be approximated, the excess remaining with the wider section. When the stage falls, the more rapid decrease of area due to the width of 18 will determine a speedy arrival at the state of equality of area at a stage represented by DD, and then a passage into the opposite relation of deficient area at the wide section. The tendency to fill the wider section continues from the time the stage passes BB on the rise until DD

is reached on the decline, after which the tendency to scour will prevail.* This is an answer to the first question stated. *The stage of equal area is variable, and approaches the limit of corresponding to change of stage as the mobility of the bed, or the duration of the extreme stages increases.* It will also be seen that *transition may occur at any intermediate stage as well as near the extremes of high and low water.* Also, that *time is an important element.* Therefore, if a high-water is followed by a season of frequent fluctuations, the consequences of the high stage may continue in such a way as to hold the surface high upon the gauge when the volume is comparatively small. If the round of the season is completed in this condition of obstructed bed, a moderately large volume may produce a serious flood. The entrance of a large tributary, having frequent and

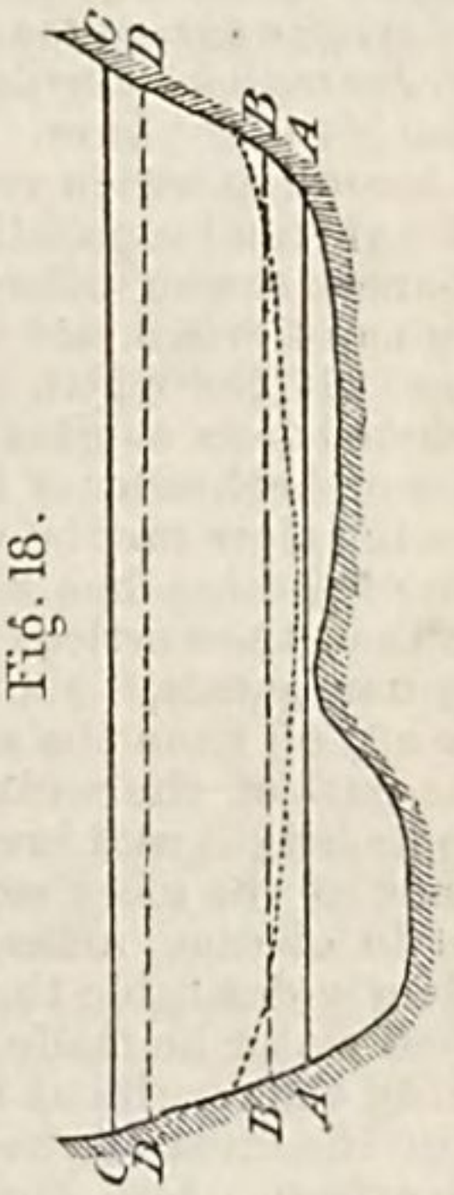


Fig. 18.

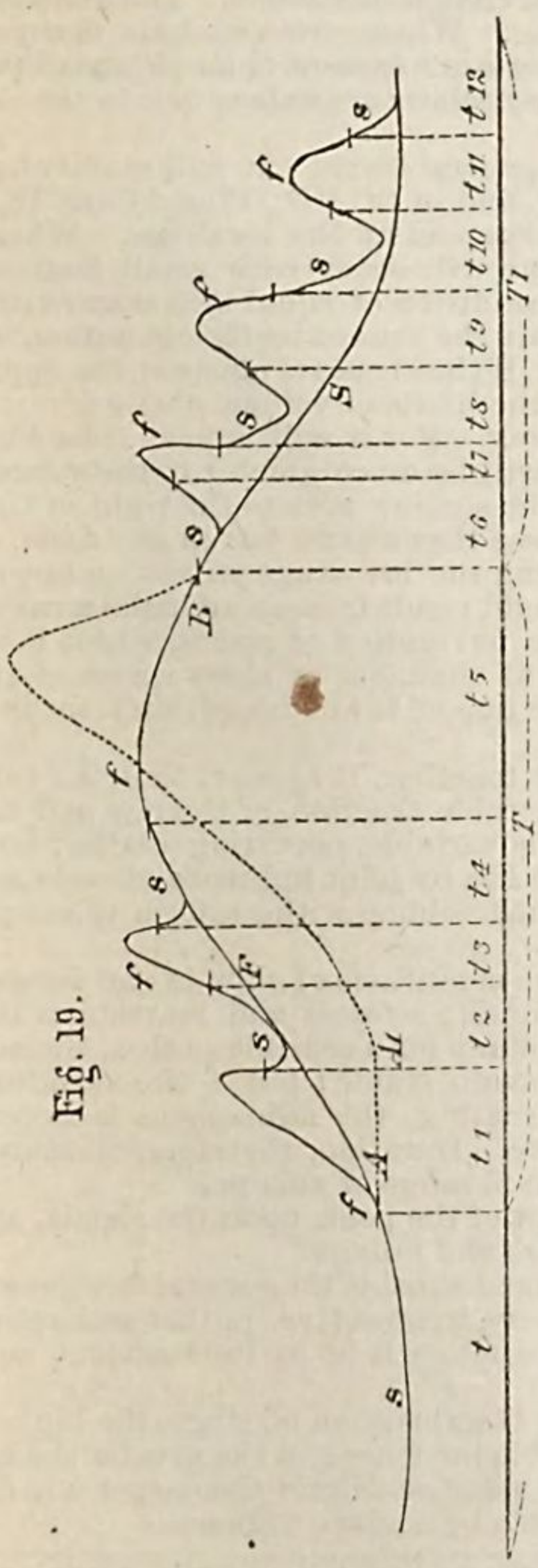


Fig. 19.

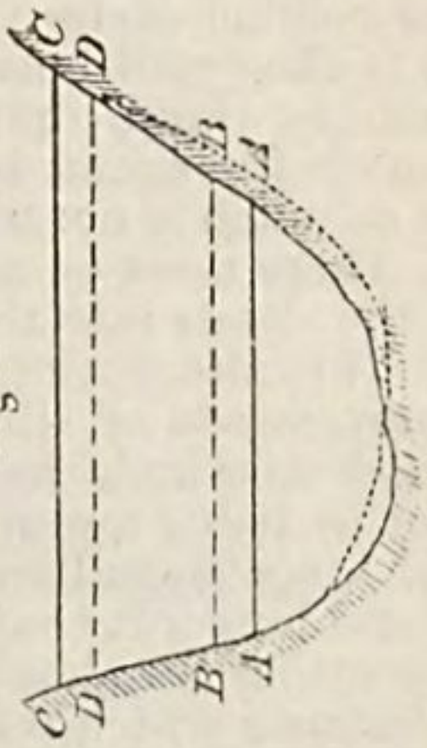


Fig. 17.

irregular floods, will produce local fluctuations of stage in the main stream which may cause frequent transitions, and a local building up of bars that may be cumulative, and compel the river to raise its level, or find relief in a progressive widening of its bed.† On the other hand, it is possible that certain combinations may occur to

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*For an example of this continuance of the state of fill see Powless's Report of March 23, 1881 (Appendix D). At the Bullerton section "a fill not only occurs on the rise from low to high water, but also on the fall from high-water to a stage about 15 feet above low-water," &c.

†The Ohio is such a tributary and there is little doubt that the Mississippi below the junction has widened its bed and deteriorated in navigability within the last half century.

cause the discharge of a large volume with comparatively low readings on the gauge.*

If in Fig. 19 the sweeping curve represent the regularly varying volume of the main river, and the irregular wave line be the added volume from a fluctuating tributary, the regular discharge of the main stream would offer but two points of transition, A and B. The period of fill would be T and of scour $T_{,}$. By a succession of floods from the tributary a number of transitions are caused, so that instead of a fill for the time T, the time of fill is $t_{,}+t_3+t_5$. The volumes passing during the intervals t_2 and t_4 do not contribute to the regular work of the river, but act against it; whence the result F must be diminished by the interruptions. The same consequence would follow shortening T by transfer of A to $A_{,,}$ and a more rapid change of volume. The general time of scour $T_{,}$ would also be shortened by $t_7+t_9+t_{11}$. Whence we conclude *that fluctuations of volume during the season of increasing volume are opposed to the filling of the bed, and like fluctuations during the season of diminishing volume are unfavorable to the scour of the bed at the wide places.*

The second question can only be answered in general terms. It will readily be seen that the vertical separation of the lines AA $BB_{,}$ and of CC $DD_{,,}$ Figs. 17 and 18, must be inversely as the difference of width at the stage and at the localities. Where the variations of width are extreme, the transitions will occur with small fluctuations of stage. If the width is nearly uniform, the condition of equal area may exist, and be departed from so gradually as to remain within the zone of inefficient action, which must lie on both sides of the transition stage; or, if the areas are unequal, the approach may be too slow for the values to cross within the limits of volume change.

Form of section has also an important bearing. For it will appear from Figs. 17 and 18 that the vertical separation of AA BB will be much greater if the submerged middle bar be raised above the level $AA_{,}$ and the shallow area to the right of the section be cut off from the stream. From this we see that a sand bar in any form, occupying a part of the width, is capable of deferring the low-stage transition in proportion to its height and breadth; and the same would result from an artificial narrowing. Since one of the most serious difficulties in the navigation of rivers, whose beds are subject to change, arises from the obliteration of channels by short waves of rise, it is evidently desirable that the separation of the line of lower transition from the line of lowest water be made great as possible.

Putting the results at the extremities of stage together, it appears that the vertical range of the crest of the shoal may be a considerable fraction of the rise and fall of water surface. Also, that the transition stage is variable, occurring earlier, both in rise and fall, as the preceding low or high stage has by joint influence of volume and duration adjusted the bed to the discharge of such volume with uniform velocity.

It has been shown that—

1st. There is a tendency to adjustment of the conditions of flow in the interest of uniform motion under which the stream continually reforms and rearranges its bed as the volume varies. If the volume remain constant for a sensible period, the adjustment to the conditions will be perfected and remain stable; but if the variations of volume be rapid, extreme, or irregularly alternating, the adjustment is imperfect. Volume is the agent, but requires time to operate. Duration, therefore, measures the effect as much if not more potently than the actual range of volume.

2d. There must be a movement of material out of the pools upon the shoals, and off from the shoals into the pools, as the stream rises and falls.

3d. This alternating movement between pool and shoal is the general law governing the movements of silt along the bottom of rivers, irrespective, in this connection, of the mode in which the material is transported, whether it be by intermittent suspension or by being swept along the bottom.†

4th. Since this alternating movement follows the variation of stage, the higher the flood and longer it continues the more considerable the mass and the greater the height of deposit on the shoals, and the longer the low stage continues the deeper and better the channels which will be cut through the shoals by a given volume.

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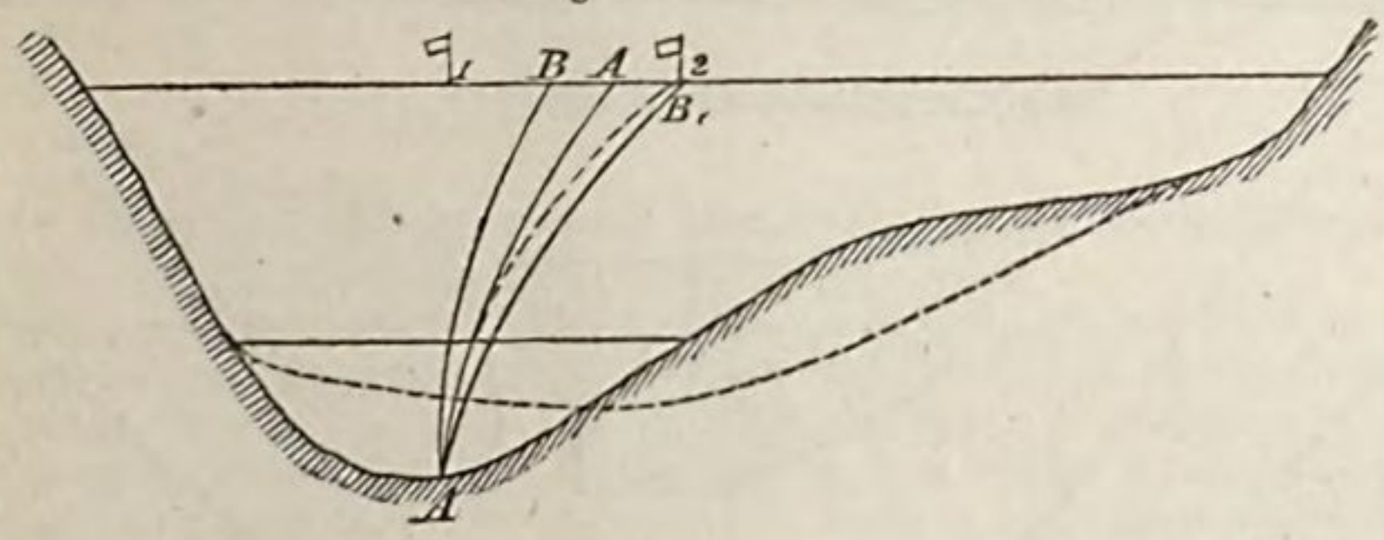
* See Humphreys and Abbot's Diagram of Discharge at Columbus, Ky., 1857 and 1858. Plate 16, Delta Survey for stages of 30 feet and over.

† This movement from pool to shoal, and from shoal to succeeding pool, covers all the movement near the bottom. According to statements of Assistant Powless, it also includes a large proportion of silt movement in suspension. He states (Appendix D, report March 23, 1881): "(A) Sediment in suspension passing Fulton November 13 to January 3, 1,011,000,000 cubic feet; (B) sediment in suspension passing Bullerton Towhead, November 13, to January 3, 1,702,000,000 cubic feet; ratio (B to A) = 1 : 1.44, this for a period of low water. For a heavier stage: (A) Sediment in suspension passing Fulton March 6 to April 11, 832,000,000 cubic feet; (B) sedimentin suspension passing Bullerton March 6 to April 11, 907,000,000 cubic feet; ratio (A to B) = 1 : 1.09. Range, $\frac{1}{1.53}$: 65 per cent. of movement may be continuous, but 35 per cent. is surely intermittent. Powless's facts are more radical than the theory I state demands.

The practical consequences of the movement, therefore, extend in two directions, which may or may not be harmonized. The one affecting the flow of waters or the the discharge of floods, the other the navigability of the channels.

This discussion of the effect of variation of volume when joined to variable width is not given as accounting for all the phenomena that may be observed, but because the influence of width variation upon area is so palpable as to afford the readiest mode of demonstrating what the result of changes of area must be. The changes shown may be taken to be such as affect the longitudinal profile of the stream as determined by the mean depth. Scours and fills may be cotemporaneous at a given section. The discussion has been concerning the excess of one over the other. In straight reaches it is impossible to say where the greatest change will be, but we may be sure that fill or scour will be so decided as to be practically exclusive each of the other. After the stream has fairly entered a bend, fills will, as a rule, be along the convex shore and scours will be mostly along the concave.

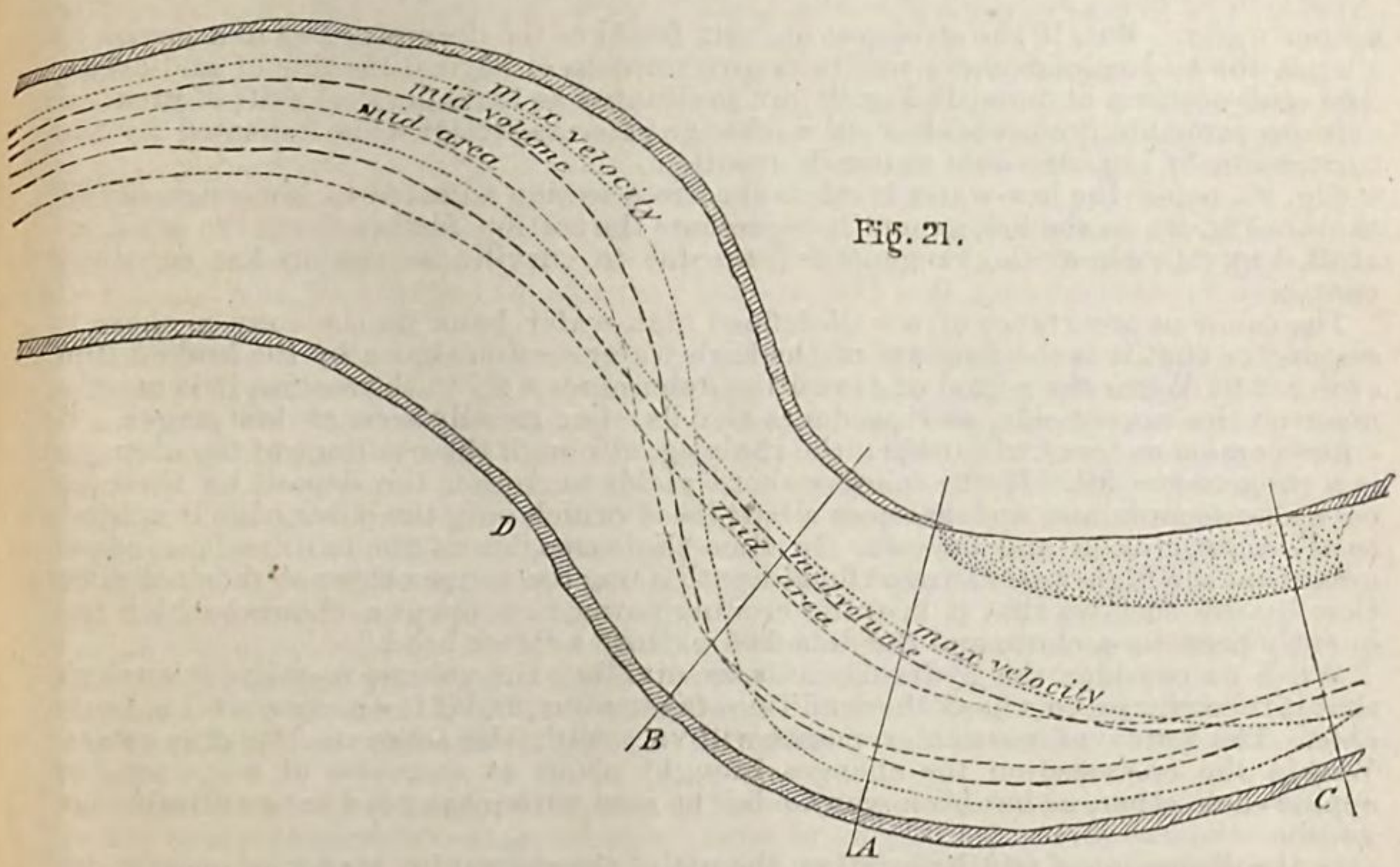
Fig. 20.



Important changes of the transverse profile may be shown to attend variation of volume under the influence of the shape or trace of the river, and the changes of direction in currents caused thereby.

The most tangible factor to represent the influence to be traced is the locus of the mid-volume, which, taken at frequent intervals in the length of a stream, would give

Fig. 21.



us the trace of the hydraulic axis. If this be done for a variety of stages, the swaying to and fro of the hydraulic axis with variation of volume will be made apparent, with the general result of a straightened trace at high stages.

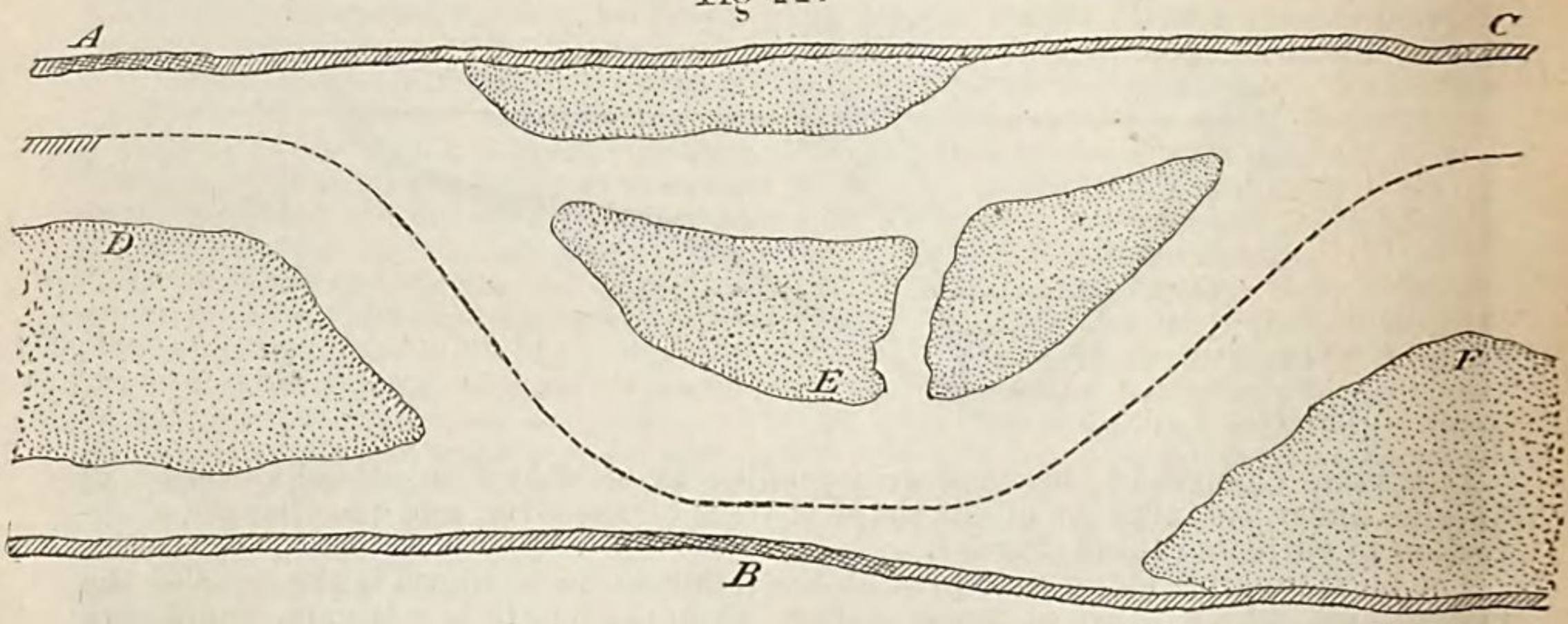
Treating the hydraulic axis as the trace of the stream, or the line about which its motion is equal, the straightened trace is shorter and steeper. Passing to extreme stages the low-water river winds its devious way among the bars with a current sometimes swift, and again almost imperceptible. The high-water river runs from point to point by the shortest available path, and has current variations much less extreme,

but as we have already seen relatively slack where the low river was rapid, and swift where it was nearly stagnant. The two rivers may have nothing in common, except that a portion of the territory occupied is the same.

Were the motion rectilinear and the cross-section symmetrical with reference to the hydraulic axis, the changes could not be predicated upon theoretical grounds. But the conditions of curvilinear motion introduce an element of certainty, which leads to important results; for the form of transverse section becomes regularly unsymmetrical, one side being steep, the opposite shelving.

If Fig. 20 represents the characteristic form of section in a bend, the line AA may be supposed to be the trace of the locus of mid-area as the surface is raised from the bottom to high-water level. AB may also be supposed the trace of the locus of mid-volume. So long as the current of greatest velocity coincides with the line of greatest depth, the mid-volume curve will be on the side of the mid-area curve toward the

Fig 22.



deeper water. But, if the strongest current forsakes the deepest water and passes to Flag 2, the mid-volume curve will be drawn towards or beyond the line of mid-areas. The cross-sections at A and B, Fig. 21, are so situated as to render such shift of greatest velocity probable, from which such a change of cross-section as is indicated by the broken line of Fig. 20 would naturally result.

Fig. 20, below the low-water level, is the cross-section adjusted to low-stage conditions. Fig. 20, as shaded, generally represents the section further down the bend, as at C, Fig. 21, where the tangential force due to curvilinear motion has regained control.

The common occurrence of a well-defined high-water bank on the convex shore is suggestive that it is the remnant of the high-water section shown by the broken line of Fig. 20. When the period of transition determines a fill in the section it is mostly made on the convex side, and produces the flat bar usually seen at low stages. A cotemporaneous scour will deepen the thalweg, although the resultant of the changes is a progressive fill. If the concave shore yields to erosion the deposit on the concave side accumulates and becomes a batture of which only the outer edge is subject to alternate erosion and deposit. In time the extension of the batture becomes so great that the high-water current finds a path along the convex shore so much shorter than by the concave that it acquires eroding power and opens a channel which frequently becomes a chute and the detached batture a "tow-head."

When we consider the hydraulic axis as dividing the volume equally, it appears that if it converges to a bank the conditions favor scour, and if it diverges a fill is probable. The action at particular points will vary with the stage as the axis sways. Within the cross-section the changes brought about at extremes of stage tend to oppose each other, as has been seen to be the case with changes due to variations of width.

In the discussion of width variation, the use of the companion section of least width was for convenience only; if we substitute for it the section of mean width, the changes indicated will be limited to the wide section.

The two specific conditions of abnormal width and variable trace at extreme stages not unfrequently coexist, and where they do generally produce a serious obstruction to navigation.

Fig. 22 represents a reach of river of abnormal width, whose main banks determine a trace of hydraulic axis at high stage nearly straight, but the low-water river creates for a particular season a bed and trace indicated by the bars and the broken

line. The high-river conditions determine a general fill throughout the reach, the fill taking the form of a succession of reefs. The low river, seeking the trace of least resistance among the reefs, finally presents parts of three reverse bends, with two inflections in the trace, and a relation to the main banks favorable to erosion at A, B, and C, with corresponding bar growth at D, E, and F. A succeeding high stage obliterates bars and channel alike, and produces a new series of reefs. When another low-stage channel is developed through the new deposit it may not resemble the former one, of which no trace will remain, except the local widening of bed at A, B, and C. If the bar E be composed of resisting material, or if snags lodging at its upper end divide the current at high-water, the growth of the bar is intensified, it becomes a tow-head, then an island. The chutes widen to compensate the area, and the former reach becomes the site of a new bend. All such changes are progressive deterioration of the river as a navigable stream, also as a channel of discharge.

In the absence of any cause to determine permanent deposits at high-water, no compensating extension from the banks will be made, and the inevitable result is a slow progressive increase of width, and with it an acceleration of the rate of deterioration of channel, a raising of flood level, and all the disadvantages of an unstable regimen.

APPLICATIONS AND CONCLUSIONS.

To connect the theory of the preceding discussions with the practical improvement of a river, it is needful to remember:

First. The removal of bars and shoals is an object sought, not only in the interest of navigation, but also to afford better facilities for the discharge of flood waters. Floods, we have seen, build up the shoals. Diminution of floods in volume is, therefore, prevention. Low stages remove bars; to increase low-stage energies is, therefore, increase of bar-removing power. The removal of bars is here spoken of as occurring at the lower stages; not as depending absolutely or relatively upon the smallness of the volume, but upon the relation of areas, which, as we have seen, changes when the river passes from a high stage to a lower.

Second. After the transition of a state of scour has occurred, its continuation does not depend upon the continued diminution of volume, but upon the absence of a rise. The energy and activity of erosion, we may safely conclude, will be directly as the volume, velocity, and disparity of areas. The progress of deepening will be inversely as the breadth of scour.

Third. So long as the volume is diminishing the direction and length of the essential trace of the stream, hydraulic axis, will be changing, and so transferring the point of wear or erosion to new positions, both with reference to the transverse and longitudinal profile, thereby broadening the water-way, and shifting the thalweg. This is a chief cause of instability of low-water channels.

Fourth. If the diminution of volume is arrested at a certain stage, and a uniform volume be practically maintained, the currents will have a fixed direction, from which the erosion will be confined to narrower bounds, and will work increase of depth instead of width.

Fifth. The result of the work being expended upon vertical scour will be a narrowed section with comparatively steep banks (to the low-water bed), thus bringing the section within the conservative influence, noted in the course of the discussion, whereby the vertical interval between the lowest stage and that of transition is increased; therefore the occurrence of a minor rise will be less likely to disturb the channel.

Sixth. The direct consequence of increase of low-stage volume and therefore of low-stage area, with the probability that by increase of area increase of navigable depth will also be obtained, is all that can be expected, if the bed be stable. But if the bed be unstable (and in direct proportion to its instability), increased low-stage volume no longer stops at the increase of area, but becomes an active agent in determining that increase of area shall be from vertical rather than lateral erosion. Normal steadiness of volume in the main stream, for a considerable period of time, is a safeguard against the unfavorable effect of irregular variations of volume from local causes.

The direct effect will continue so long as the added volume bears a considerable proportion to the natural low-stage volume. How far this influence may extend, or what the limits of proportion may be that will materially affect the area, cannot now be determined. The indirect effect will extend further than the direct, because it is in the proportion of volume and mobility of bed, probably a product of the two, rather than their sum. The importance of the first factor diminishes, that of the second increases with distance traversed upon the Mississippi, and generally upon large rivers. Therefore we may expect tangible results from increase of volume throughout the length of the river traversed by it.

A discussion of this subject in connection with the improvement of a river system upon a harmonious plan would be very incomplete were not notice taken of the fact

that the subject has a negative as well as a positive side, meaning thereby that a reservoir action is already in operation, which may be interfered with and lost. It may be suggested that the lakes and swamps must already be acting as reservoirs to lessen flood and increase low or mean stage discharge. In a legitimate sense, a good proportion of the rainfall absorbed by porous soils and rocks is stored in reservoirs for a more equable discharge from springs. Regarded in this sense, it will be recognized that the discharge of a stream during a season of drought is always a reservoir flow. During the high-water season the channels of the main stream and all its tributaries are full. The emptying of the channels is a true reservoir flow, and we have but to make a mental estimate of the collective area of the Mississippi and its branches, with the range of stage, say, from July 1 to December 1, to grasp the fact that no inconsiderbale proportion of the flow of the main river during this period comes from the reservoir of the river's own bed. It needs no argument to prove that drainage and reclamation of swamps, and wet lands generally, must be destructive of the natural reservoir action, and, hence, that the variations of volume of any given stream will be more extreme as agricultural improvements are extended and perfected. Against this progressive cause of deterioration, the main river is in some measure protected by the extent of its basin and number of tributaries. It is equally obvious that a general and efficient protection against overflow will lessen the reservoir action. Also, that such a system of channel regulation as facilitates the discharge at high-water stages will also hasten the emptying of the channel reservoirs, and, as a result, the low-stage volume will be impoverished.

These considerations are general, but if we attentively consider the consequences of mobility of bottom, we discover other important facts and consequences that must be considered. Among them, that, within the channel reservoir, a very perfect system of automatic dams and sluices exists, which holds the reservoir action of the channel in reserve, and regulates the discharge so effectively that it must be recognized as an important conservative agent.*

The specific purpose of channel regulation, as commonly advocated, is to destroy the shoals which constitute the dams of this system. It is therefore prudent to inquire what conservative agent can be substituted for them?

The introduction of the relative relation between volume variation and the changes of tranverse and longitudinal profile throws much light upon the special topic of the consequences of regulation of volume. The subject so introduced might be pursued profitably, for it may furnish the solution of many hitherto unexplained phenomena. Among them is the progressive deterioration of channels, by increase of width extending over long distances of river; the increased extent and more rapid progress of caving banks; and the slow but sure raising of flood level. The discussion of those topics might be made an argument for a thorough examination into the possibility of extending the natural reservoir action as a necessary collateral to permanent channel improvement, fixation of the banks, and protection against overflow.

I conclude, what I hope may be but a preliminary discussion, by stating, in the form of propositions, what I believe can be proven.

First. The unfavorable condition and progressive deteriorating of the Mississippi is due, in great part, to the prevalence of high-stage conditions, and the consequent accumulation of high-stage effects.

Second. The slow progress of deterioration is indicative of the fact that the predominance of high-stage conditions, while decided, is not great.

Third. If the predominance could be shifted to the low-stage conditions, the cumulative consequences would be correction of present evils and a progressive amelioration of the river in all respects.

Fourth. When two similar quantities are unequal, the inequality may be reversed by transfer of any quantity greater than one-half the predominance. The quantity to be transferred bears no relation to the original unequal quantities, and may be either small or great.

Fifth. If the preponderance against stability is great and increasing, any form of permanent improvement requires its correction, as an attendant, or antecedent, step. If it be small, considerations of economy demand that the balance be shifted to the side of low-stage conditions, so as to have the favor instead of the opposition of natural forces.

Sixth. The summation of these propositions is an enforcement of the principle enunciated in the first report of the Commission:

"If the normal volume of water in a silt-bearing stream flowing in an alluvial bed

---

*The reservoir action of Lake Pepin, and the variable dams below it, is incidentally mentioned by General Warren (page 913, Report of 1878, part 2). No figures are given, but it is probable that the vertical range of the controlling bars below the Chippewa is great enough to impound no mean volume in Lake Pepin. The area and impounding above every variable bar in the river may not be so important singly, but when the aggregate is taken it is enormous.

of its own formation be permanently increased, there will result an increase of velocity, and consequently of erosion and silt-bearing power, an increase in area of average cross-section, an ultimate lowering of the surface slope; and, conversely, if the normal flow be decreased in volume there will ensue a decrease of velocity, silt-transporting power and mean sectional area, and an ultimate raising of the surface slope."

Respectfully submitted.

ROBT. E. McMATH,
Assistant Engineer.

B. M. HARROD,
Chairman Committee on Reservoirs, Mississippi River Commission.

REPORT OF MISS. RIVER COMMISSION. 1881.

IN TWO SHEETS.
I. SHEET.

APPENDIX B PLATE 1.

SURVEY OF THE

MISSISSIPPI RIVER

Made under the direction of

THE MISSISSIPPI RIVER COMMISSION

INDEX CHART

Scale:

To accompany final Report upon Secondary Triangulation from Cairo to Memphis.

NOTE

The numbered Points represent the Triangulation Stations.

REPORT OF MISS. RIVER COMMISSION. 1881. IN TWO SHEETS. 2. SHEET. APPENDIX B PLATE 1.

SURVEY OF THE

MISSISSIPPI RIVER

Made under the direction of

THE MISSISSIPPI RIVER COMMISSION

INDEX CHART

Scale:

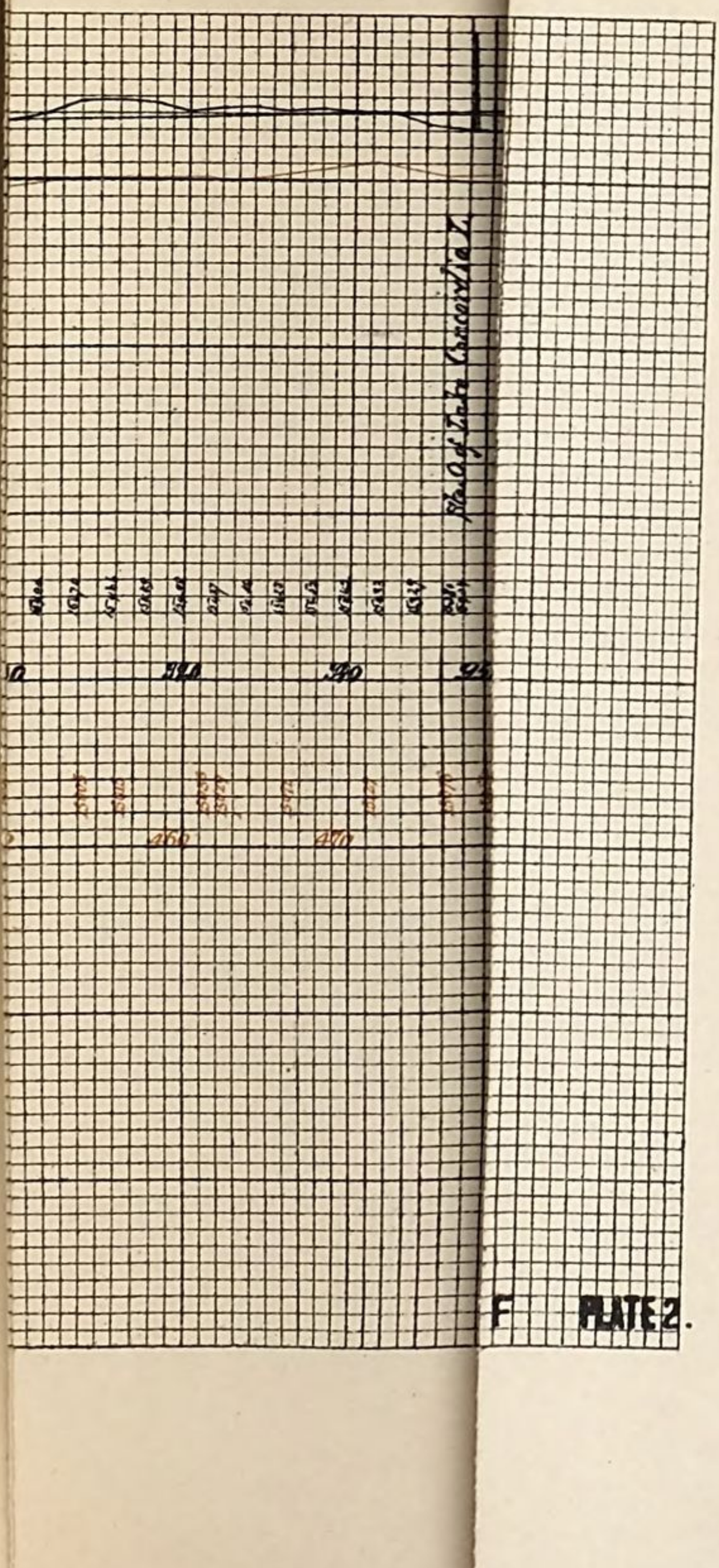
0 1 2 3 4 5 6 7 8 9 10 Miles

To accompany final Report upon Secondary Triangulation from Cairo to Memphis.

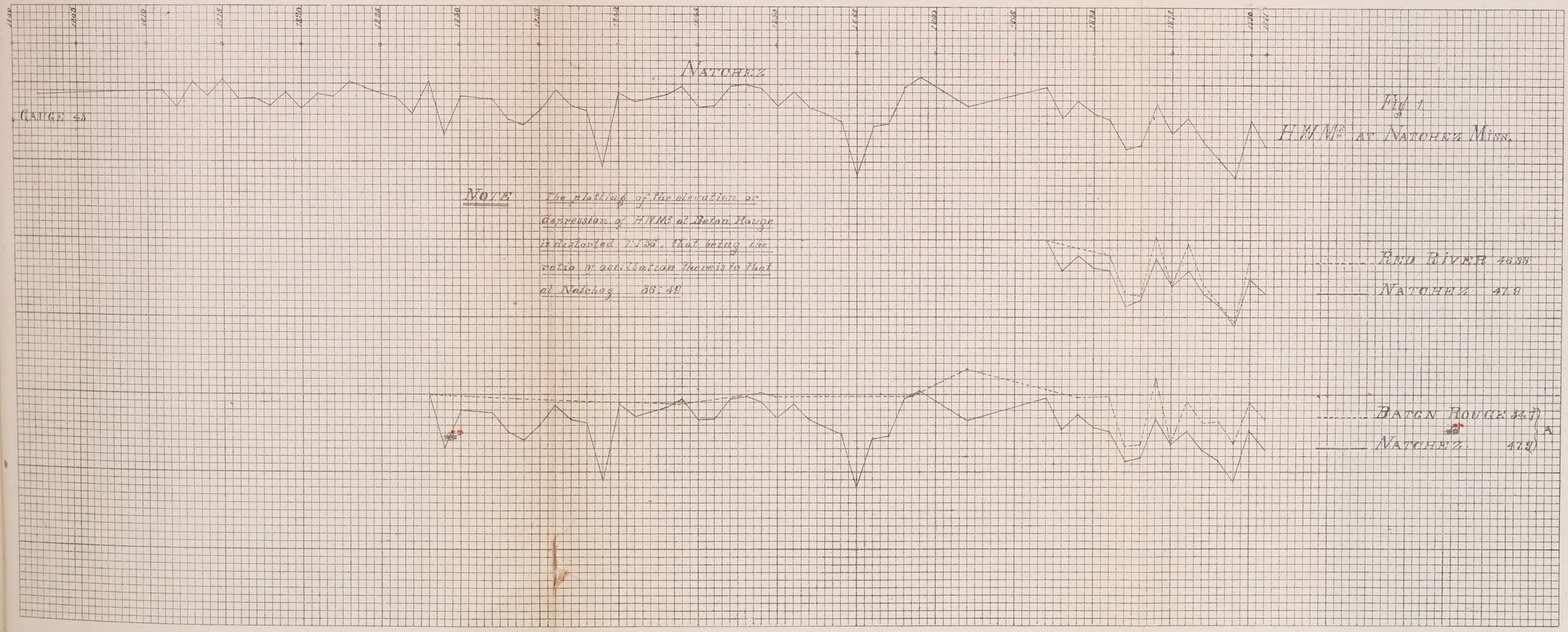
NOTE

The numbered Points represent the Triangulation Stations.

Note. Black broken line represents location of black profile.
Sienna broken line represents location of Sienna profile



F PLATE 2.


1805
1810
1815
1820
1825
1830
1835
1840
1845
1850
1855
1860
1865
1870
1875
1880
GAUGE 45
NATCHEZ
NOTE The plotting of the elevation or depression of H.W.M.s at Baton Rouge is developed 1.135. That being the ratio of observation there is to that at Natchez 36.49
Fig 1
H.W.M.s AT NATCHEZ MISS.
RED RIVER 46.38
NATCHEZ 47.9
BATON ROUGE 34.7
NATCHEZ. 41.2

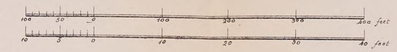
ATCHAFALAYA REGION

Scale = 0 1 2 3 4 5 6 7 8 9 10 Miles.

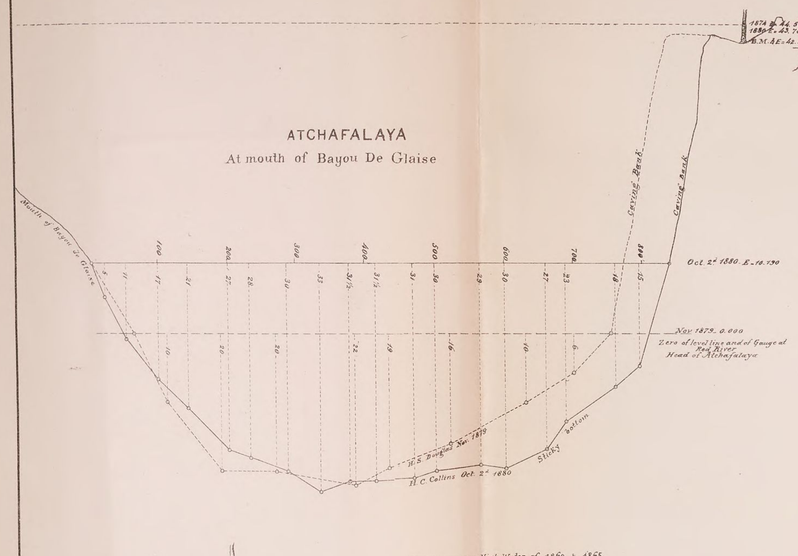
ALEXANDRIA
B. Rapides
B. Rapides
RED RIVER
RED RIVER
BLACK RIVER
RED RIVER
B. Cut-off
FORT ADAMS
Avoyelles Prairie
B. Des Glaises
Turnbull Id.
OLD RIVER
Red R. La.
Atchafalaya R.
THIRTY FIRST PARALLEL
Bayou Boeuf
B. Huffpower
Bayou Rapides
Bayou Boeuf
Bayou Rapides
B. Rouge
B. Lafourche
Cow Head B.
MISSISSIPPI RIVER
BAYOU SARA
MORGANZIA
WATERLOO
PORT HUDSON
B. Terrebone
Osso
OPELOUSAS
B. Courtableau
Atchafalaya R.
Bayou Manchac
Bayou Manchac
Bayou Grosse Tete
Choctaw B.
BATON ROUGE
B. Portage
Bayou Teche
B. Teche
B. Portage
B. Bayou
Bayou Sorrel
PLAQUEMINE
MERIDIAN
VERMILLIONVILLE
Vermillion River
Grand R.
Bayou
Whiskey Bay
B. Sorrel
L. Rondo
L. Chico
B. Portage
L. Tasso or Spanish L.
NEW IBERIA
Bayou Petite Anse
Bayou Teche
Big Bayou Pigeon
GRAND LAKE
Wax Lake Outlet
L. Palourde
B. Boeuf
Bayou Sale
Atchafalaya Bay
B. Carlin
B. Chene
B. Penchant
VERMILLION BAY
COTE BLANCHE BAY
ATCHAFALAYA BAY
GULF OF MEXICO

COMPARATIVE PROFILE OF ATCHAFALAYA RIVER

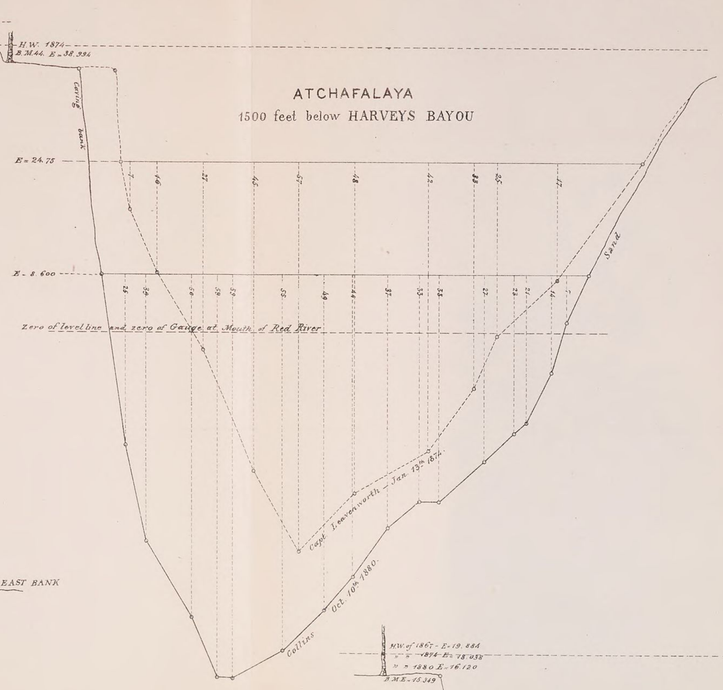
SCALES { HORIZONTAL / VERTICAL



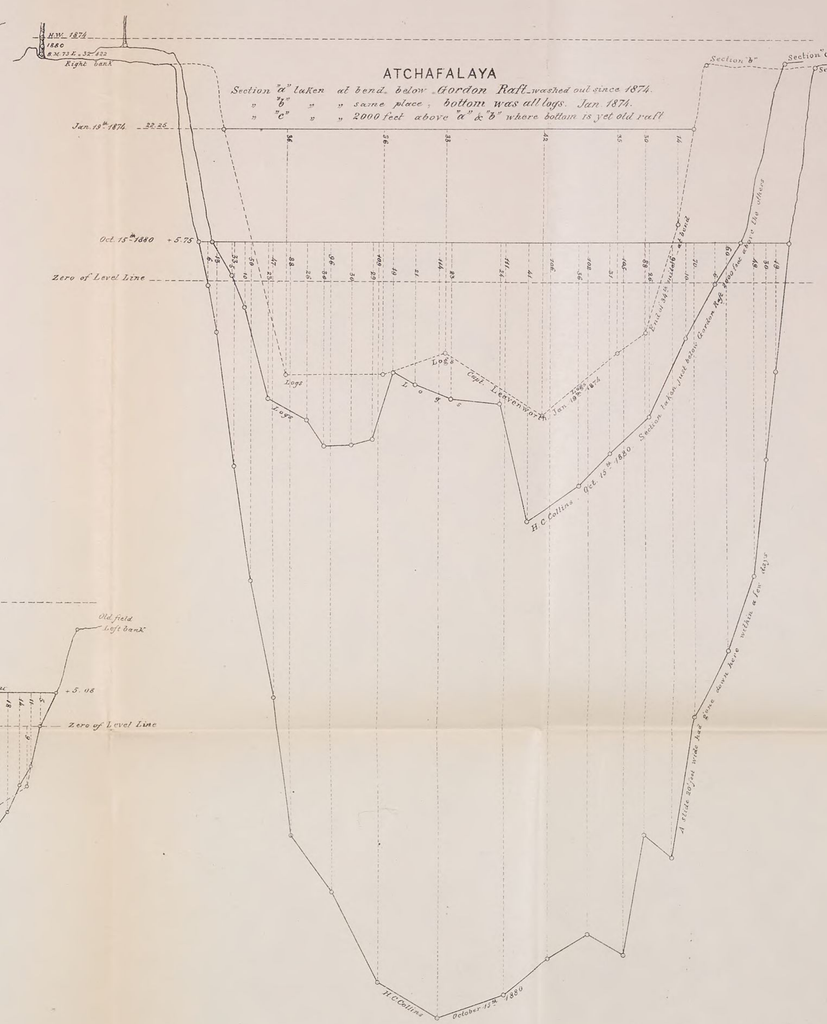
ATCHAFALAYA
At mouth of Bayou De Glaise


1874 B.M. E=44.509
1880 E=43.780
B.M. AE=43.377
Mouth of Bayou de Glaise
Caving Bank
Sloping Bottom
Oct 2d 1880 E=19.130
Nov 1879. 0.000
Zero of level line and of Gauge at Red River Head of Atchafalaya
U.S. Rangers Nov 1879
H.C. Collins Oct 2d 1880

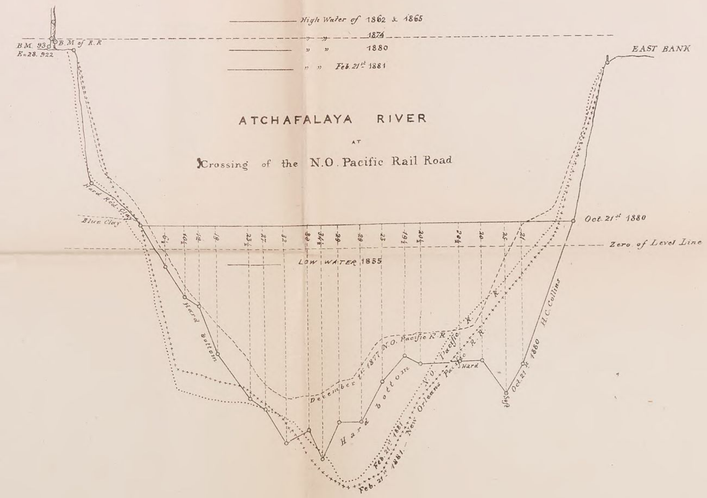
ATCHAFALAYA
1500 feet below HARVEYS BAYOU

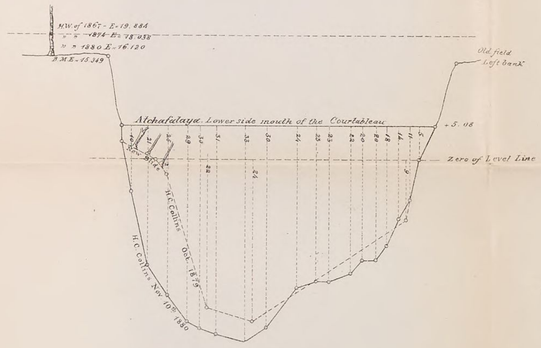


ATCHAFALAYA
Section "a" taken at bend below Gordon Raft washed out since 1874.
" "b" " " same place; bottom was all logs. Jan 1874.
" "c" " " 2000 feet above "a" & "b" where bottom is yet old raft



ATCHAFALAYA RIVER
AT
Crossing of the N.O. Pacific Rail Road





REPORT OF MISS. RIVER COMMISSION. 1881.

APPENDIX H PLATE I

HYDROGRAPHS.

1881.

FEBRUARY. MARCH. APRIL. MAY JUNE. JULY.

Sioux City. Decatur. Omaha. Nebraska City. Plattsmouth. Bellevue. Boonville. St. Joseph. Atchison. Leavenworth. Lexington. Kansas City. Rocky City. Glasgow. St. Charles.

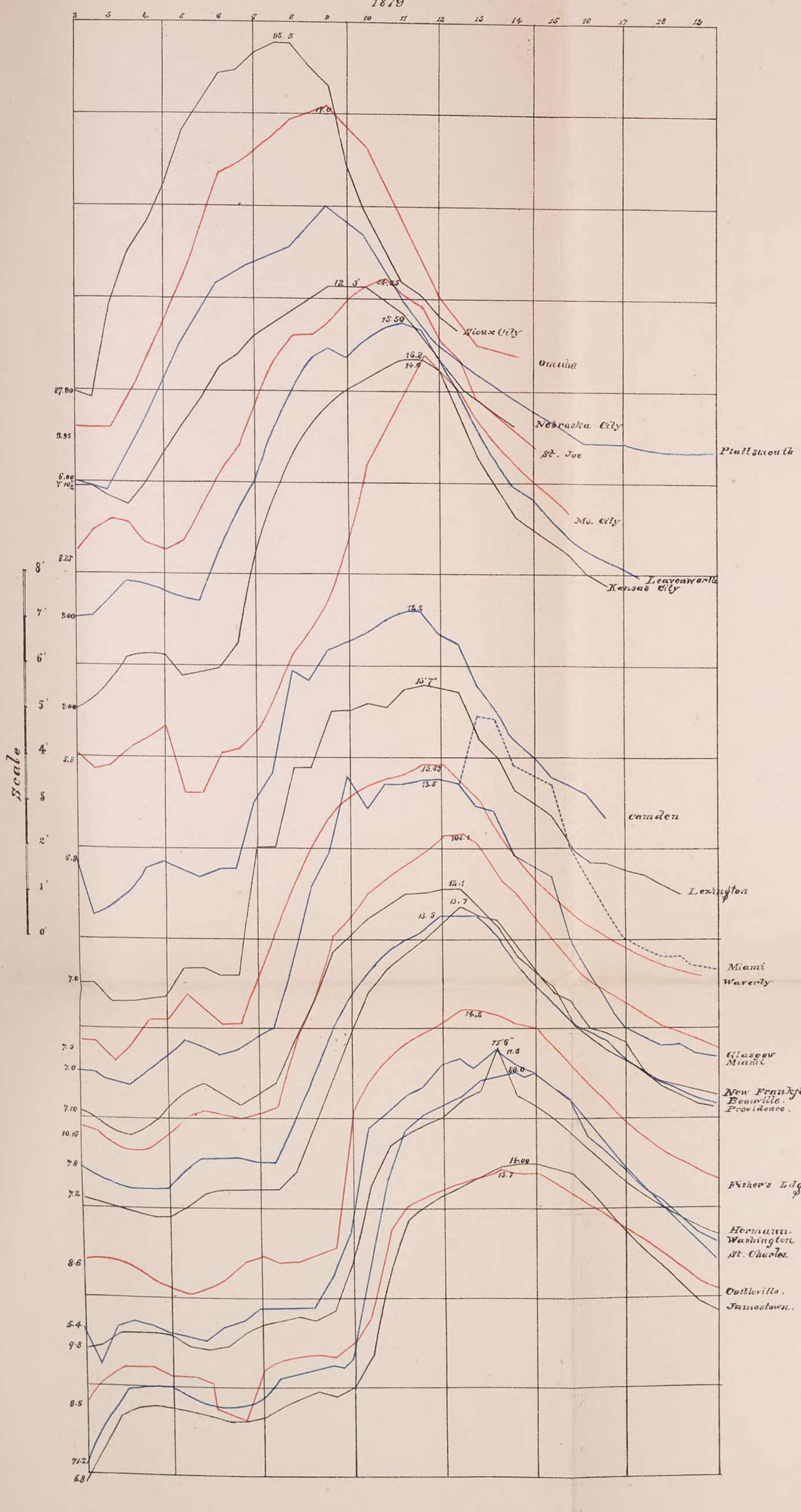
Vermilion. Sioux City. Decatur. Blair. Plattsmouth. Nebraska City. Bellevue. Omaha. White Cloud. St. Joseph. Atchison. Leavenworth. Kansas City. Lexington. Cedar City. Glasgow. St. Charles.

White Cloud. Plattsmouth. Lexington.

SCALE OF FEET.

HYDROGRAPHS.

REPORT OF MISS. RIVER COMMISSION. 1881. *April. 1879* APPENDIX H PLATE 2.



Missouri River.

Curves for various rises indicating local rates of travel of the crests thereof.

Sioux City
Decatur
Blair.
Omaha
Plattsmouth
Nebraska City
Brownville.
White Cloud
St. Joseph
Atchison.
Leavenworth.
Kansas City
Missouri City
Camden.
Lexington
Waverly.
Miami
New Frankfort
Glasgow.
Booneville.
Providence
Cedar City.
Fishers Ldg.
Hermann.
Washington.
Cotterville.
St. Charles.
Jamestown Ldg.

LOCALITY.

Distances in miles.

300
200
100
0
500
400
300
200
100
50
0

Note: Figures in brackets on Curves indicate height attained by the rises on Sioux City Gauge.

Note: The dates are those on which the height was attained.

June 19. 1880 (24.7)
May 26. 1880 (28.0)
June 4. 1880 (28.0)
April 4. 1880 (19.0)
April 20. 1880 (24.0)
April 12. 1880 (21.2)
June 20. 1880 (26.4)
June 13. 1876 (28.3)
July 9. 1880 (23.9)
July 9. 1880 (19.3)

Time (in days) of travel of crest of wave or rise from Sioux City.

REPORT OF MISS. RIVER COMMISSION. 1881.

APPENDIX H PLATE 4.

MISSOURI RIVER.

Curves for various rises indicating local rates of travel of the crests thereof.

LOCALITY.

Sioux City.
Decatur.
Blair.
Omaha
Plattsmouth
Nebraska City
Brownville.
White Cloud
St. Joseph
Atchison
Leavenworth.
Kansas City.
Missouri City.
Camden.
Lexington.
Waverly.
Miami.
New Frankfort.
Glasgow.
Boonville.
Providence.
Cedar City.
Fisher's, Ldg.
Hermann.
Washington.
Colleville.
St. Charles.
Jamestown. Ldg.
Mouth of River.

Distances in miles

800 700 600 500 400 300 200 100 50 0

1 2 3 4 5 6 7 8 9 10 11 12

June 9th 1879 (61.95)

April 2nd 1880 (87.8)

April 17th 1879 (93.5)

September 6th 1878 (80.95)

April 4th 1881 (100.6)

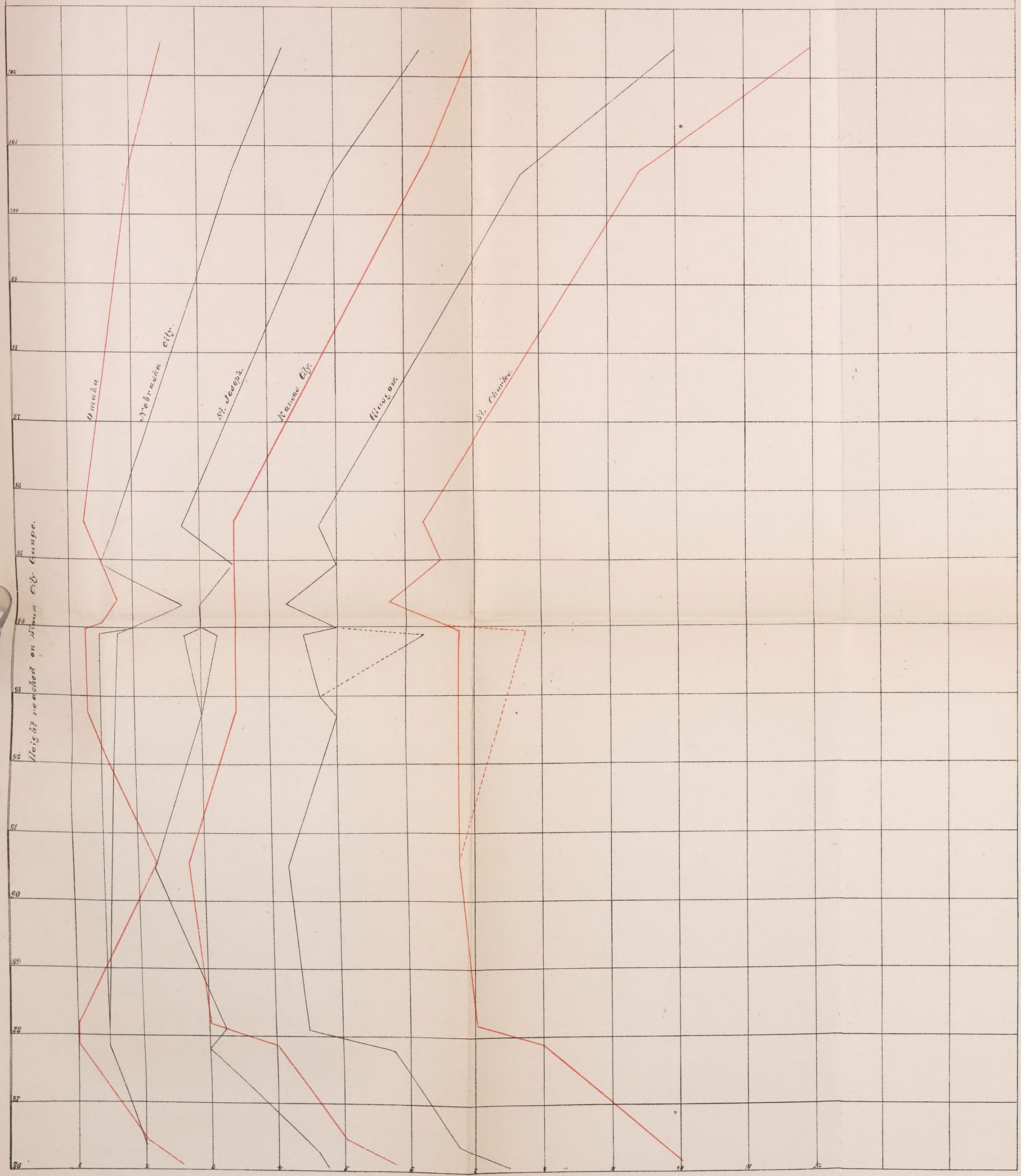
April 23rd 1881 (102.4)

Note: Figures in brackets on the Curves indicate the height attained by the "rises" in the Sioux City Gauge. Dates refer to those in which these heights were attained.

Time (in days) of travel of crest of wave or 'rise' from Sioux City.

Missouri River.

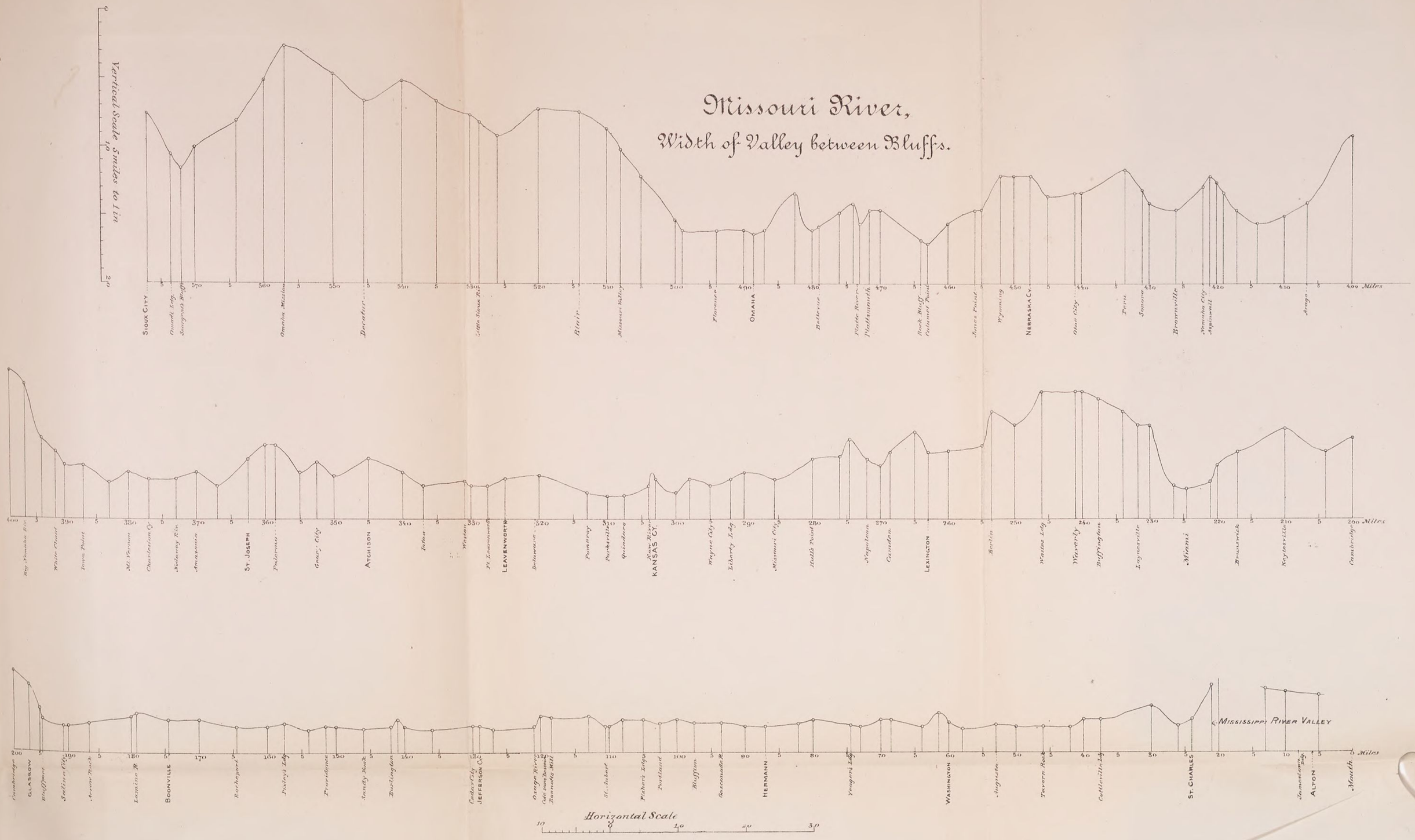
Curves showing the relation betw. the heigth of rise on Sioux City Gauge and time of travel of "rise" to places indicated in the curve.



Time (in days) of travel of crest of wave or "rise" from Sioux City.

Missouri River,

Width of Valley between Bluffs.



MAP
OF THE
MISSISSIPPI RIVER
in the vicinity of
NEW MADRID
from surveys
made by order of

THE MISSISSIPPI RIVER COMMISSION
1879 - 80

With location of borings made in 1878 under the direction of
MAJOR C.R SUTER, Corps of Engrs. U.S.A

Scale: 1 Mile, 3/4, 1/2, 1/4, 0 Mile; 1, 2, 3, 4, 5 Miles

MISSOURI

KENTUCKY

NEW MADRID

Boring No 1

Boring No 2

Morrison's Lde

Thos. Dawson

Boring No 19

Boring No 24

Boring No 21

Boring No 22

LIT. RIV. VAL. LARK. R.

John Marr

Lower Madrid Landing

WATSON'S POINT

Widow Cross

Howard

L. Everel

Benj Shurls

J.K. Robbins

Boring No

D Comfort

E.H. Lavallee

Noland's Ldg

Toney Ld'g

Murray Phillips

R.C. Everel

Boring No 17

DONALDSON'S Pt

Boring No 18

Mrs. Dickinson

D.W. Dickinson

STATE LINE

D.E. Beckham

W.H. Toler

ISLAND No 10

Toler's Landing

Marr's Landing

Boring No 15 (submerged at date of survey)

R. Holyfield

Stewart's Ld's

M. Donaldson

Boring No 14

Boring No 13

Atkinson

Richard Darnell

Darnell's Ld's

E. Beshire

John Marlin

Point Pleasant

Boring No 4

Hines

Westbrook Estate

M. Phillips

Williams Landing

Phillip's Landing

Le Sieur

Lazelle's Landing

Jos. Lazelle

Wm Jones

Island No 12

H.B. Isler

M.D. Merriweather

Ruddle's Landing

Boring No 6

Geo. L. Gold

Geo. Price

RUDDLE'S POINT

Boring No 8

Tiptonville

Shaws Ld's

J. Shaw

Morris Williams

J.E. Somers

Lavalle's Landing

ISLAND No 8

Harrison Babcock

FRENCH'S POINT

Phillips Estate

Boring No 10

Mrs. Cornwell

Newson's Landing

Boring No 9

C.W. Reed

Willice

Boring No 12

J. Mitcham

Phillip's Estate

Boring No 3

I. Cooper

Franz

Boring No 5

J.W. Lesler

T.W. Morgan

Legend

- Indicates shallow boring i.e. one which terminates in the Alluvium.
- Indicates deep boring i.e. one which passes through the Alluvium
- Indicates borings not in Alluvium

No	Year	Authority	Depth	Ft. B.M.
1	1880	MISS. RIVER COMM'N	140.00	135.00
3	"	"	154.60	147.40
4	"	"	139.80	133.00
5	"	"	151.40	145.00
6	"	"	113.60	111.70
7	"	"	129.50	127.00
8	"	"	120.00	113.25
9	"	"	127.50	118.00
10	"	"	215.35	201.60
12	"	"	100.50	109.50
13	"	"	102.25	98.00
14	"	"	100.50	90.00
15	"	"	100.35	92.35
16	"	"	100.75	108.35
17	"	"	100.60	68.50
18	"	"	100.25	96.00
19	"	"	207.35	179.00
20	"	"	100.00	102.00
22	"	"	206.75	201.75
24	"	"	100.50	113.00
		CAIRO		
1	1877	Maj. COMSTOCK	102.91	108

OHIO RIVER

CAIRO

CAIRO & ST LOUIS

Ohio R. Levee

Boring No 16

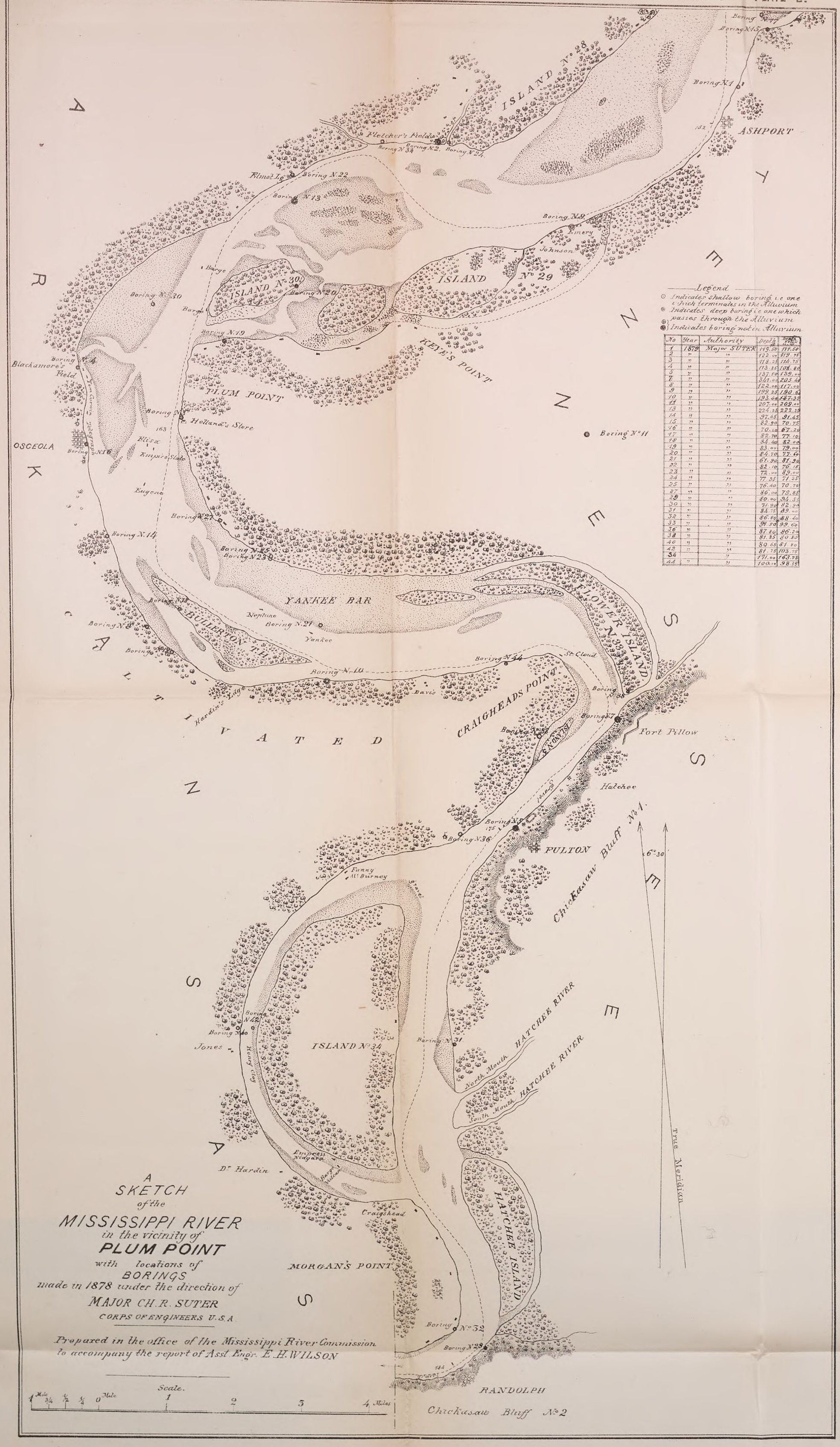
Boring No 17

Boring No 18

89° 30' 89° 27' 89° 24' 89° 21' 89° 18'

36° 36' 36° 33' 36° 30' 36° 27' 36° 24' 36° 21'

37° 00'



Legend

⊙ Indicates Shallow boring i.e one which terminates in the Alluvium

⊛ Indicates deep boring i.e one which passes through the Alluvium

⊕ ⊛ Indicates boring not in Alluvium

No	Year	Authority	Depth	Depth below Datum
1	1879	Major SUTER	149.50	119.50
2	"	"	122.00	119.75
3	"	"	118.25	114.75
4	"	"	113.25	108.80
5	"	"	137.50	139.00
7	"	"	341.00	205.40
8	"	"	122.00	117.00
9	"	"	199.25	190.60
10	"	"	193.40	187.35
11	"	"	207.00	209.00
13	"	"	224.25	222.25
14	"	"	97.45	91.45
15	"	"	82.90	70.75
16	"	"	70.00	67.25
17	"	"	82.70	77.10
18	"	"	84.90	82.00
19	"	"	83.00	79.00
20	"	"	84.70	77.60
21	"	"	67.90	81.90
22	"	"	82.10	76.15
23	"	"	72.00	89.00
24	"	"	77.35	71.25
25	"	"	76.40	70.70
27	"	"	86.00	73.85
29	"	"	80.00	94.55
30	"	"	71.90	82.90
31	"	"	84.75	89.00
32	"	"	86.80	88.40
33	"	"	94.50	99.60
36	"	"	87.80	86.20
38	"	"	81.35	80.50
40	"	"	80.65	81.60
42	"	"	81.75	103.75
34	"	"	171.00	163.75
44	"	"	100.00	98.35

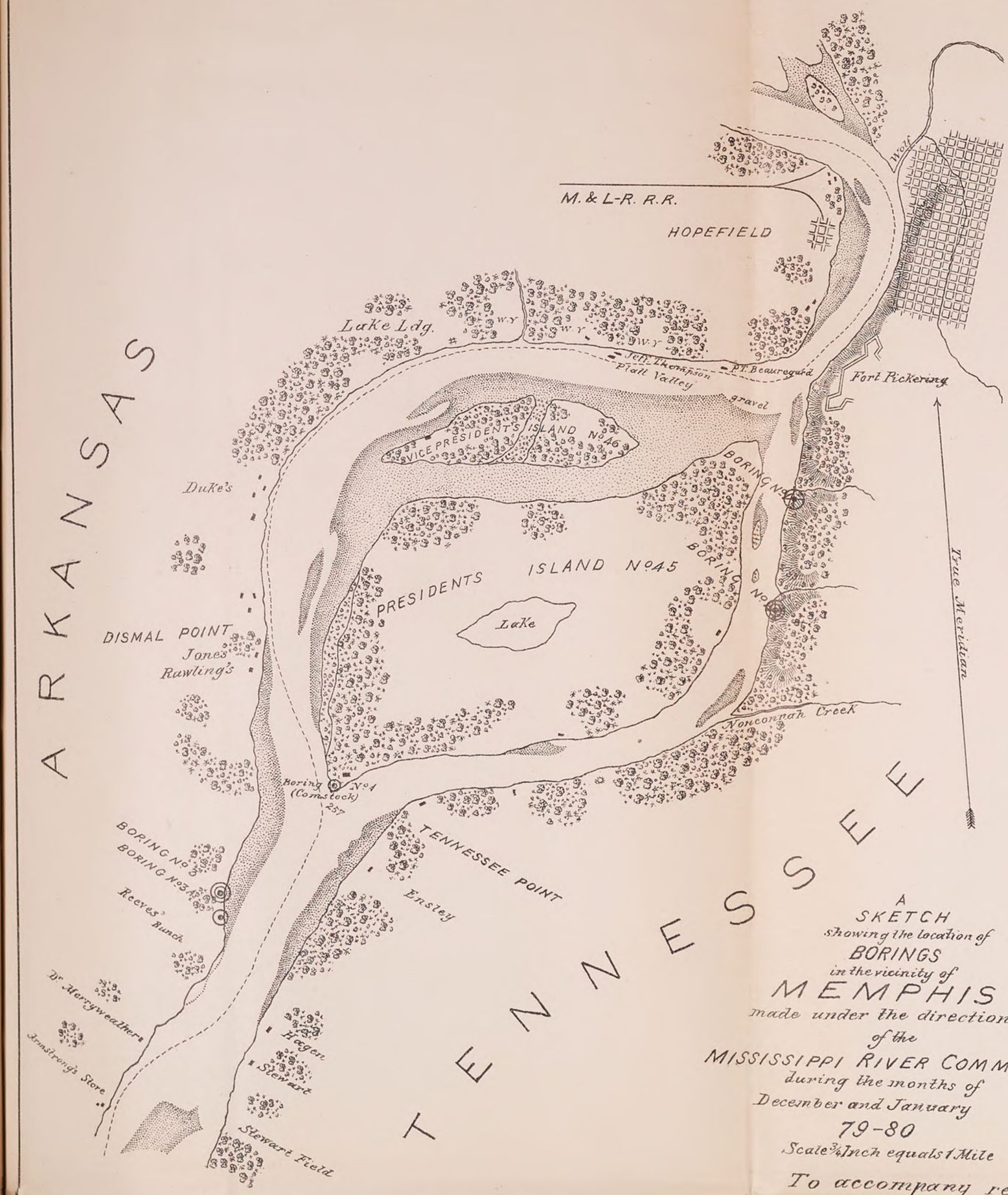
A SKETCH of the MISSISSIPPI RIVER in the vicinity of PLUM POINT

with locations of BORINGS made in 1878 under the direction of MAJOR CH. R. SUTER CORPS OF ENGINEERS U.S.A.

Prepared in the office of the Mississippi River Commission to accompany the report of Asst. Engr. E. H. WILSON

Scale.

1 Mile 3/4 1/2 1/4 0 Mile 1 2 3 4 Miles



Legend

○ Indicates shallow boring i.e. one which terminates in the Alluvium

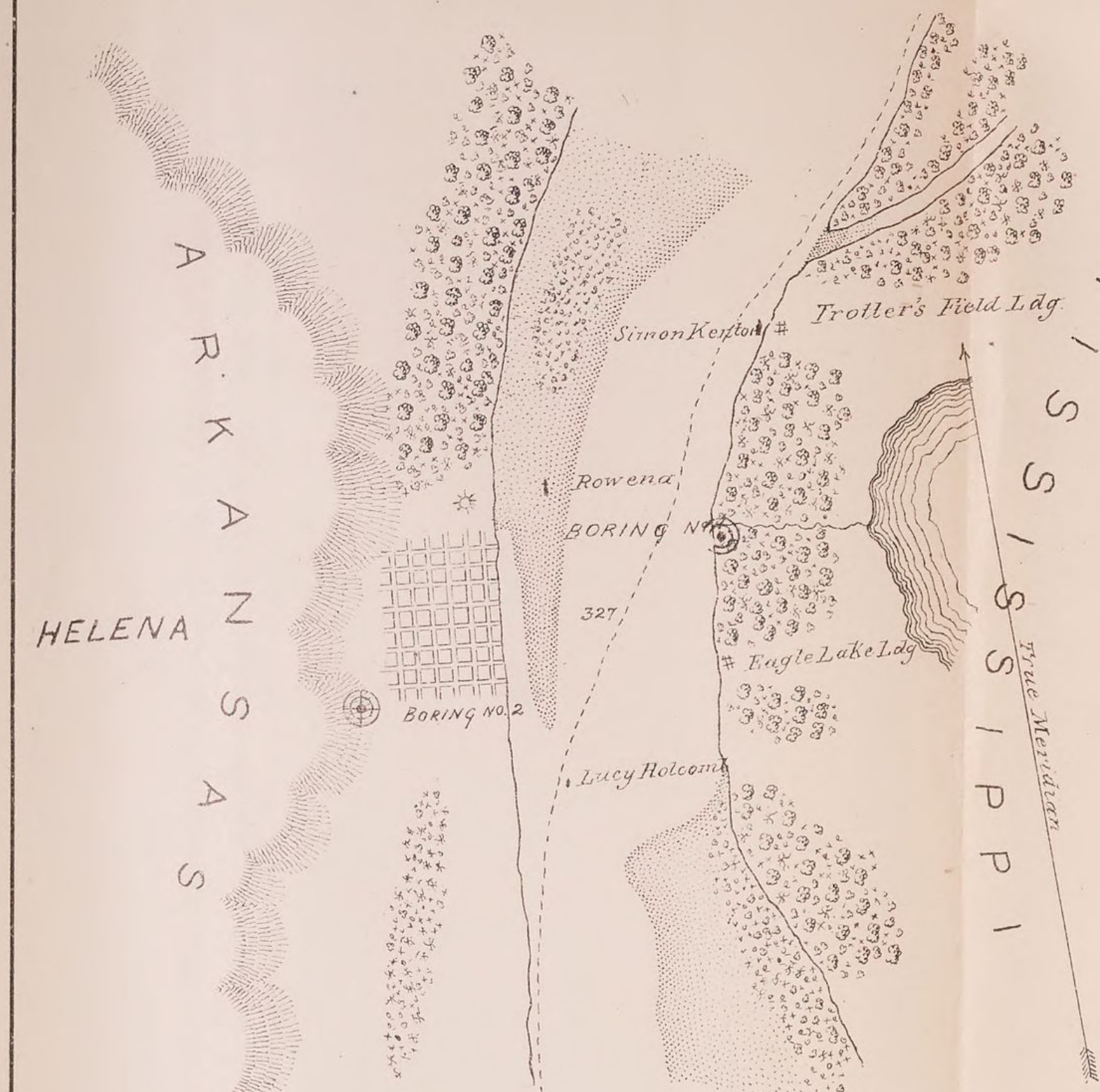
○ Indicates deep boring i.e. one which passes through the Alluvium

⊕ ⊕ Indicates boring not in Alluvium

No	Year	Authority	Depth	Depth below H.W
1	1880	Miss. River Commission	107.00	34.00
1	1877	Comstock	97.75	177.00
2	1880	Miss. River Commission	274.50	222.00
3	" "	" " " "	175.00	175.00
3A	" "	" " " "	61.00	64.00

A
SKETCH
showing the location of
BORINGS
in the vicinity of
MEMPHIS
made under the direction
of the
MISSISSIPPI RIVER COMMISSION
during the months of
December and January
79-80
Scale ¾ Inch equals 1 Mile

To accompany report of E.H. Wilson of June 1881
as Appendix III



Legend

⊙ Indicates Shallow boring i.e one which terminates in the Alluvium

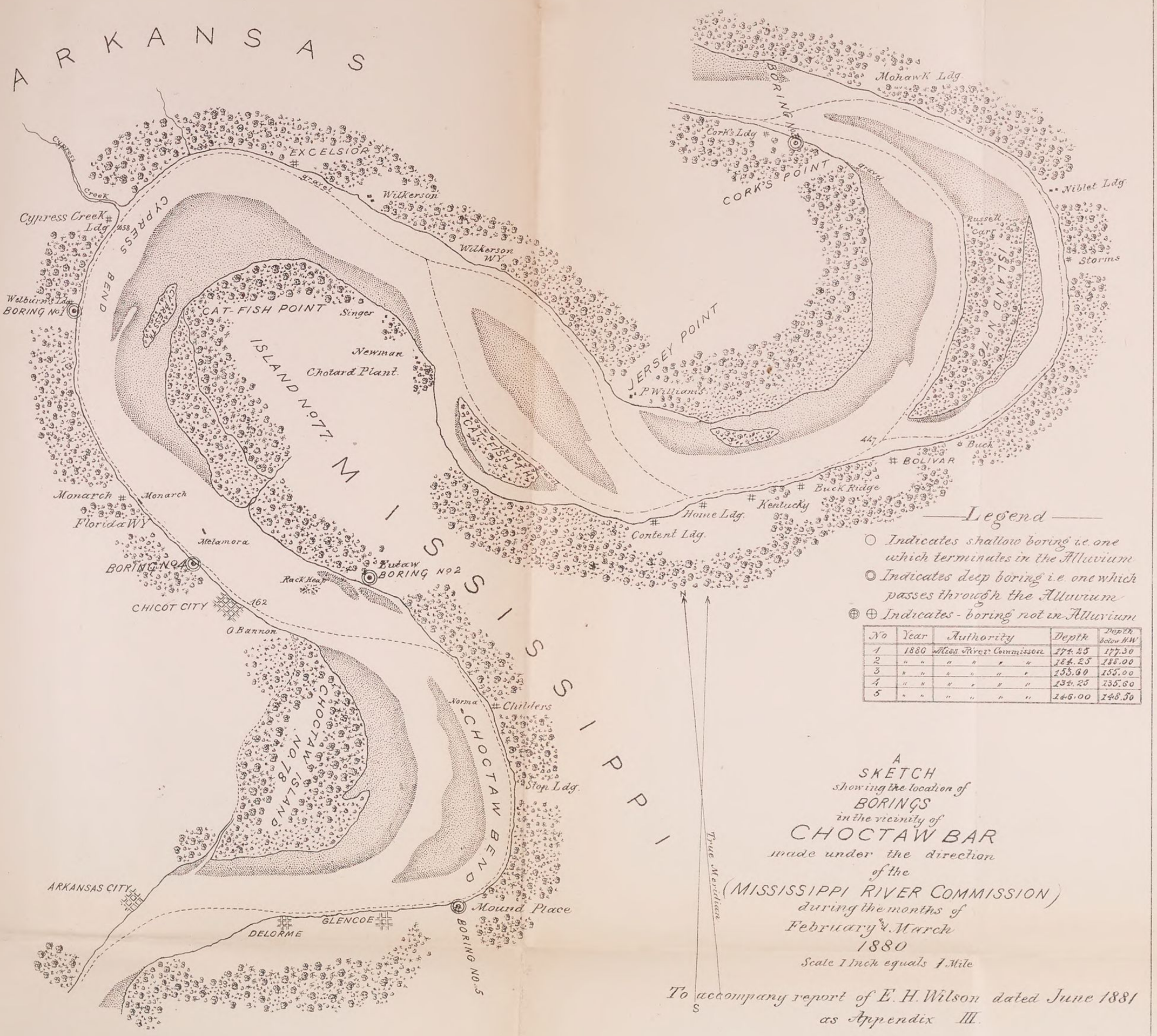
◎ Indicates deep boring i.e one which passes through the Alluvium

⊕ ⊕ } Indicates boring not in Alluvium

No	Year	Authority	Depth	Depth below M.S.
1	1880	M. R. C.	206.00	206.90
2	1880	M. R. C.	236.00	78.00

A
SKETCH
showing the location of
BORINGS
in the vicinity of
HELENA
made under the direction
of the
MISSISSIPPI RIVER COMMISSION
during the months of
January and February
1880
Scale 1 Inch equals 1 Mile

To accompany report of E. H. Wilson of June 1881.
as Appendix III.



Legend

○ Indicates shallow boring i.e. one which terminates in the Alluvium

◎ Indicates deep boring i.e. one which passes through the Alluvium

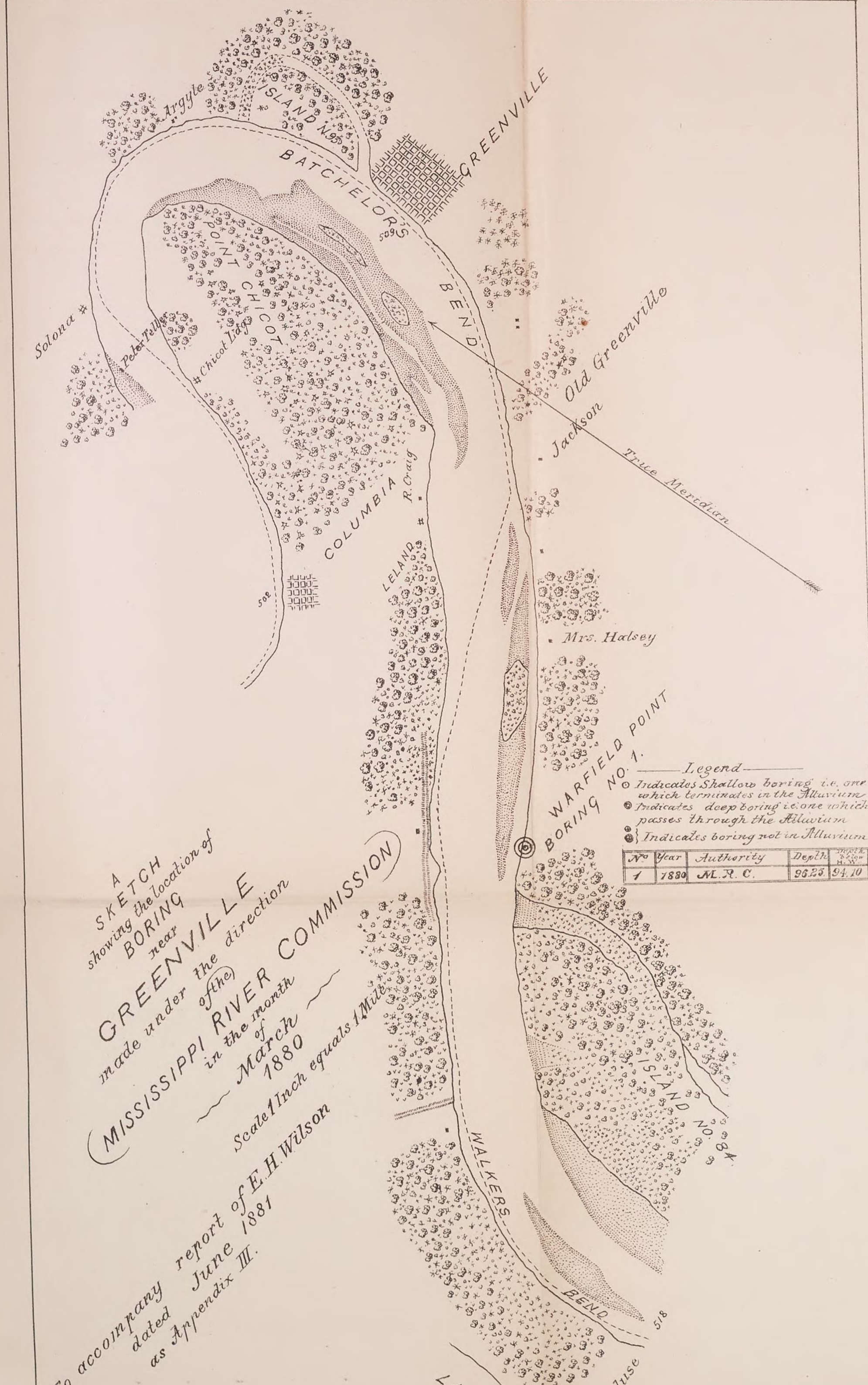
⊕ ⊕ Indicates - boring not in Alluvium

No	Year	Authority	Depth	Depth below H.W
1	1880	Miss. River Commission	174.25	177.30
2	" "	" " " "	184.25	188.00
3	" "	" " " "	155.60	155.00
4	" "	" " " "	134.25	135.60
5	" "	" " " "	146.00	148.50

A
SKETCH
showing the location of
BORINGS
in the vicinity of
CHOCTAW BAR
made under the direction
of the
(MISSISSIPPI RIVER COMMISSION)
during the months of
February & March
1880
Scale 1 Inch equals 1 Mile

True Meridian

To accompany report of E. H. Wilson dated June 1881
as Appendix III.



No	Year	Authority	Depth	Height of Flow H. M.
1	1880	M. R. C.	96.25	94.10

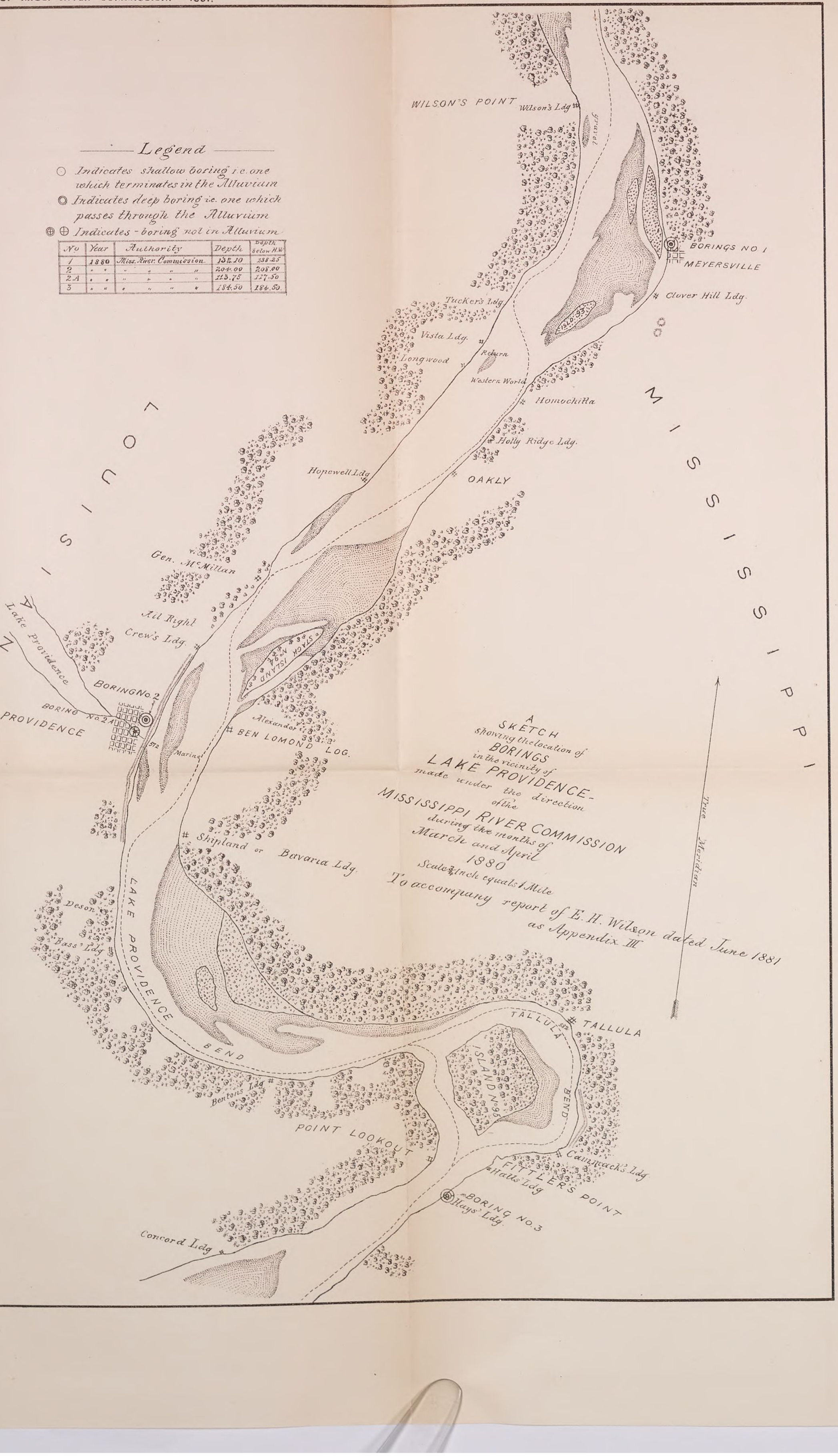
Legend

○ Indicates shallow boring i.e. one which terminates in the Alluvium

◎ Indicates deep boring i.e. one which passes through the Alluvium

⊕ ⊕ Indicates - boring not in Alluvium

No	Year	Authority	Depth	Depth below H.W.
1	1880	Miss. River Commission.	152.10	238.25
2	" "	" " " "	204.00	208.00
2A	" "	" " " "	113.75	127.50
3	" "	" " " "	184.50	184.50.



A SKETCH showing the location of BORINGS in the vicinity of LAKE PROVIDENCE- made under the direction of the MISSISSIPPI RIVER COMMISSION during the months of March and April 1880

Scale ¾ Inch equals 1 Mile

To accompany report of E. H. Wilson dated June 1881 as Appendix III

M

New Madrid Borings.

Vertical Scale 0 10 20 ft.

High Water 1880

Section 40 ft below Water Surface

Datum Plane

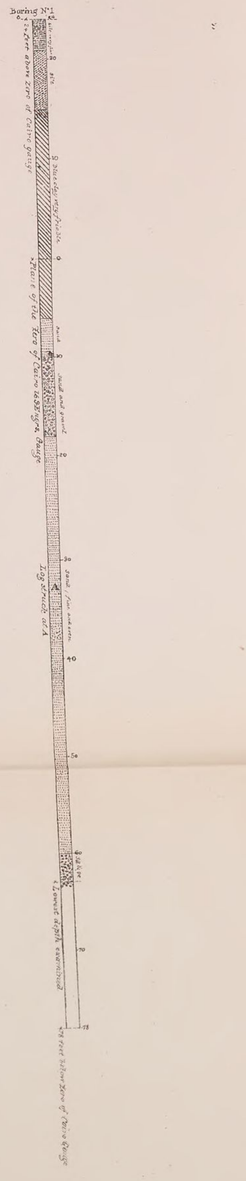
B

B

Note — Lines marked B indicate the elevation of the lowest point of the river in the vicinity of the borings

Boring at Cairo Ill.

Reproduced from Chart No 2 Survey of the Miss River

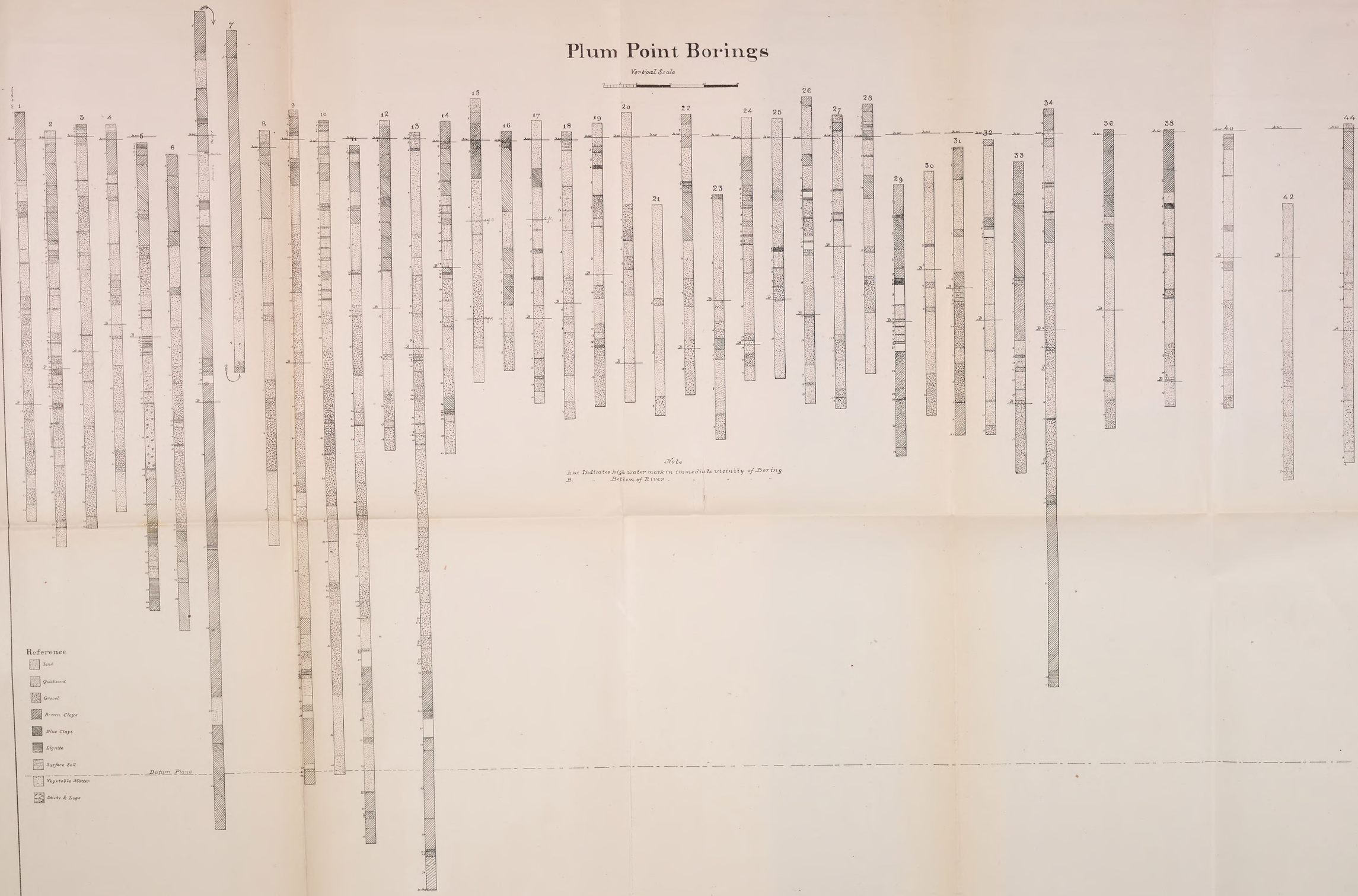


Reference

- Sand
- Quicksand
- Gravel
- Brown Clays
- Blue Clays
- Lignite
- Surface Soil
- Vegetable Matter
- Sticks & Logs

Plum Point Borings

Vertical Scale



Note

h.w. Indicates high water mark in immediate vicinity of Boring

B. " Bottom of River " " " "

BORINGS on the MISSISSIPPI RIVER at or near CHOCTAW BAR

MEMPHIS 1. 2. 3. 3A.

HELENA 1. 2. 3.

1 4. 2. 5.

GREENVILLE 1. 1.

LAKE PROVIDENCE 2. 2A. 3

High Water of March 1880 approximate

Note—Lines marked B denote bottom of river in the vicinity of the boring.

Boring at Memphis, Chart No 6 Approved Miss. River Survey 1881.

BORINGS near MEMPHIS and HELENA made in 1874 and 1879 under the direction of CHAS. P. COCHRAN, Corps of Engineers. Plotted from data in Report of Capt. H. M. Chittenden, Corps of Engineers, 1881.

Gravel (sub-aqueous)

Sand

Clayey sand

Sandy clay

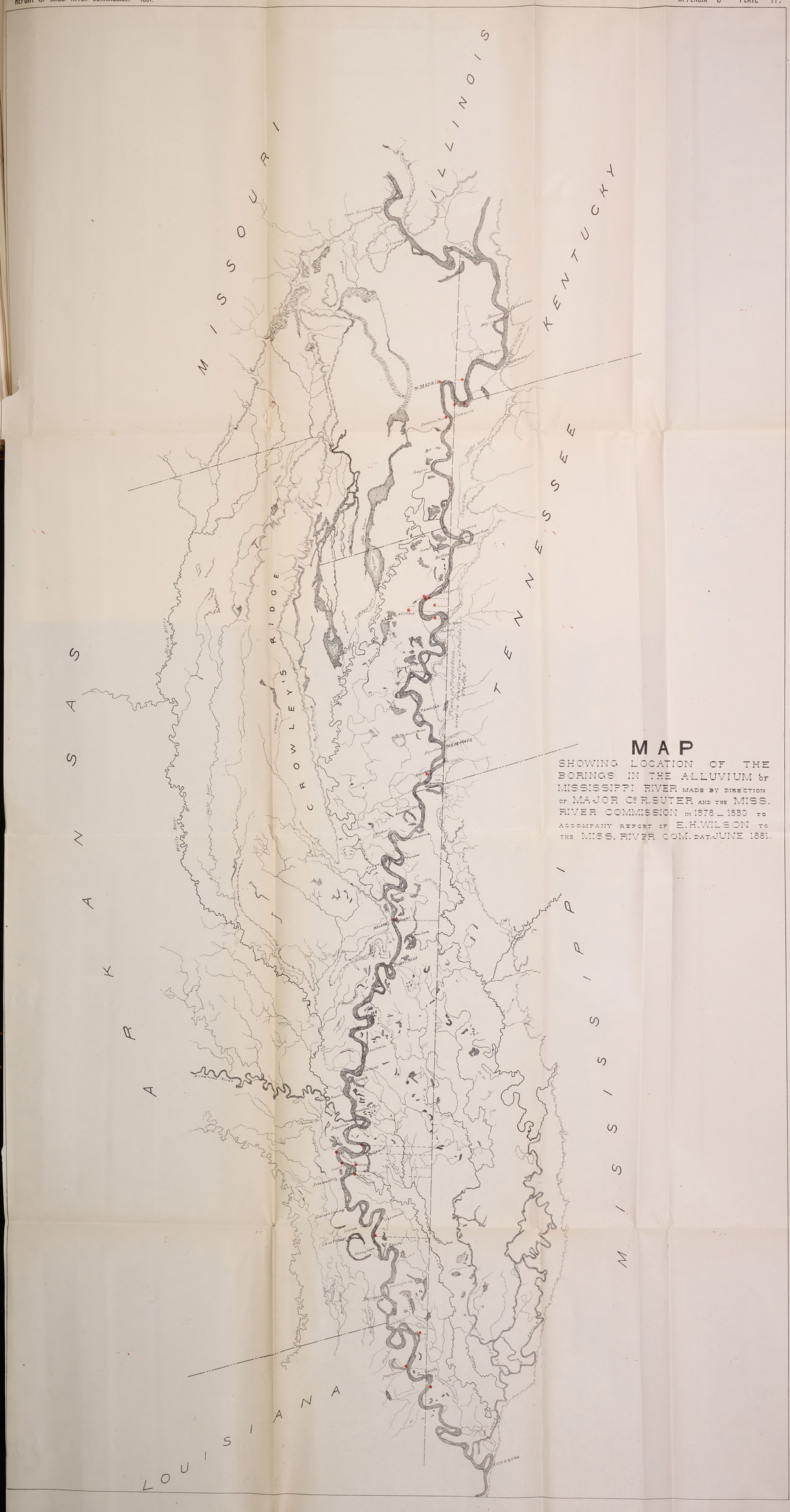
Alluvial Clay. Cretaceous

Alluvial Clay. Tertiary

Yazoo Clay and Jackson Tertiary

Vertical Scale: 1 inch = 50 feet

Key Map



MAP

SHOWING LOCATION OF THE BORINGS IN THE ALLUVIUM of MISSISSIPPI RIVER MADE BY DIRECTION OF MAJOR CH.R.SUTER AND THE MISS. RIVER COMMISSION IN 1878 – 1880 TO ACCOMPANY REPORT OF E.H.WILSON TO THE MISS. RIVER COM. DAT. JUNE 1881.

High water of 1880.

Average Maximum Depth in Bends.

CAIRO
COLUMBUS
NEW MADRID
PLUM POINT
MEMPHIS
HELENA
CHOCTAW BAR
GREENVILLE
MYERSVILLE
LAKE PROVIDENCE
HAYS LANDING
VICKSBURG.

Boring N°18 Island N°10.
Av. of 5 Borings
Boring N°34
Boring N°21
Av. of 6 Borings.
Boring N°10.
Boring N°3. Only Alluvial Boring Here.
Boring N°1. Only Alluvial Boring Here.
Boring N°1. Av. of 5 Borings.
Greenville Boring.
Boring N°3. Cone Pt. Ark.
Boring N°3.
Boring N°1.
Boring N°2.

← Northern Lignitic Strata at base of Alluvion. →

Horizontal Scale.

Miles.

Vertical Scale.

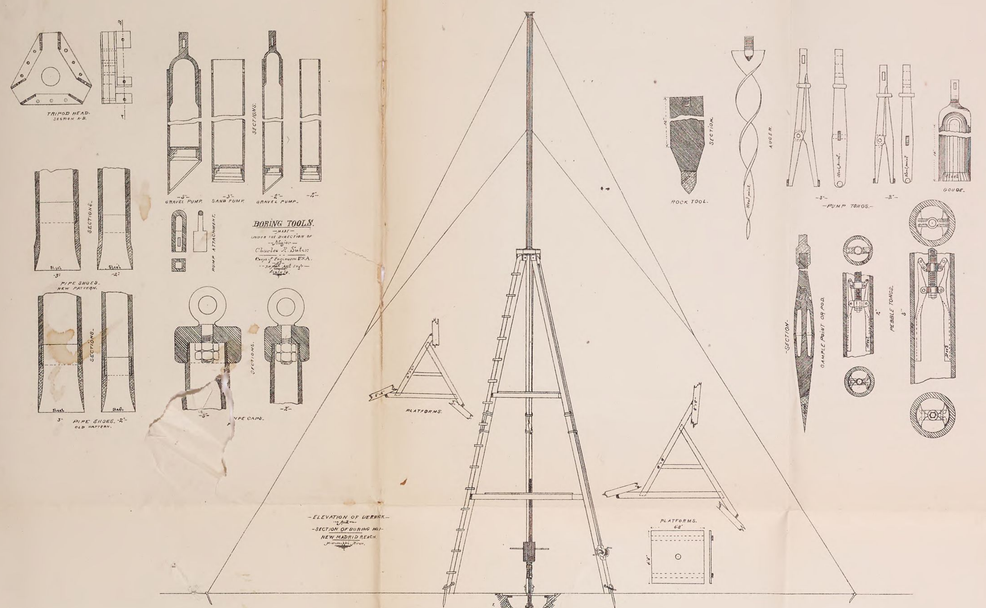
Feet.

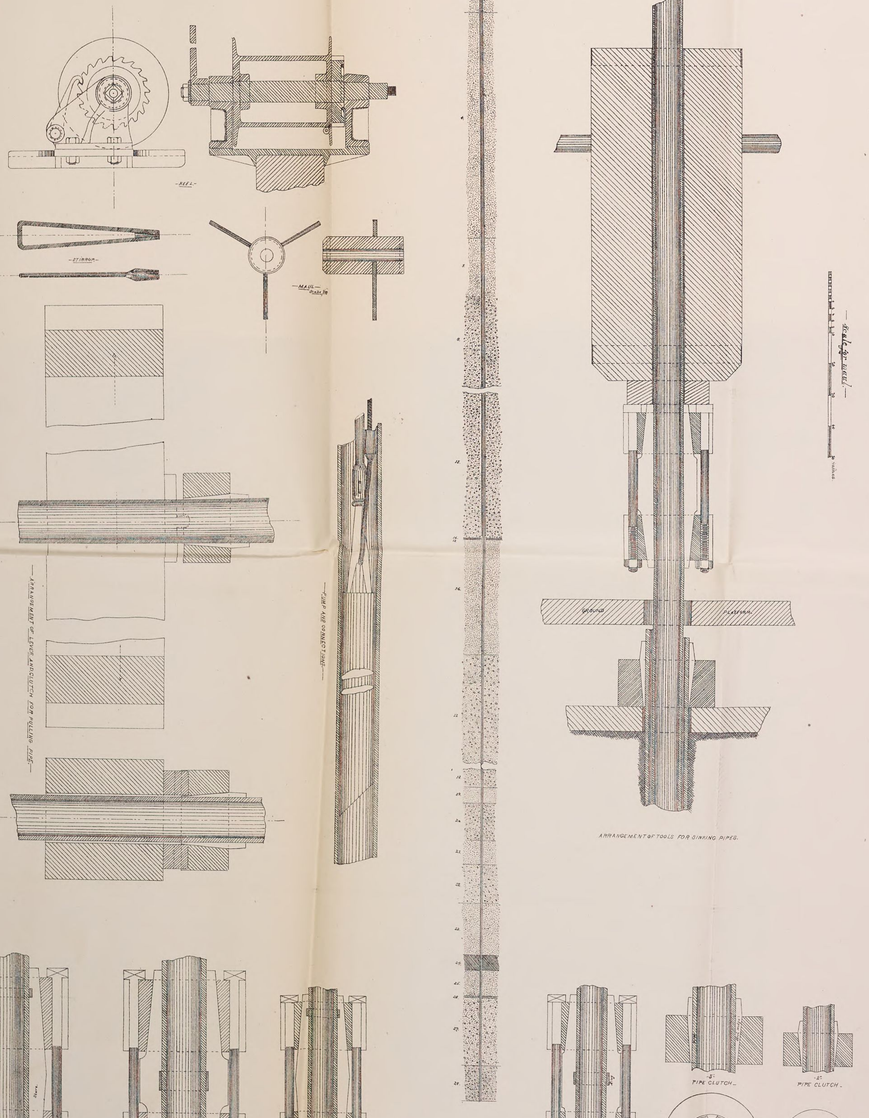
Continuous line runs through points of least depth of Alluvion below H.W.
Broken - - - - - average - - - - - -
Dotted - - - - - greatest - - - - - -

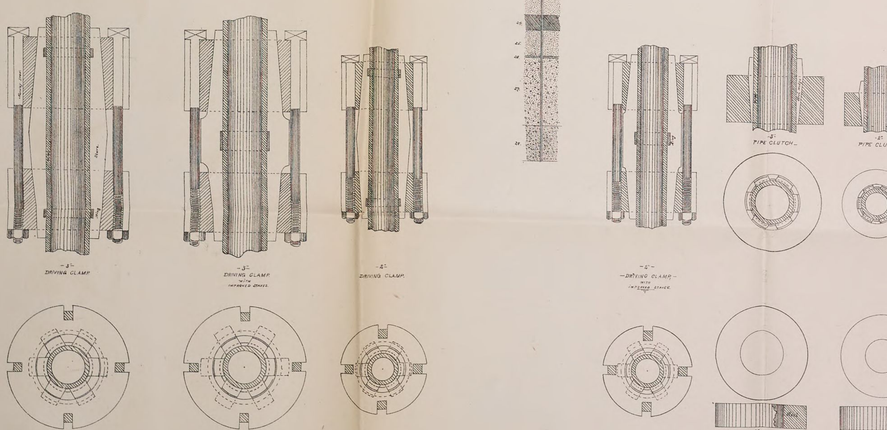
Borings all terminated in the marks of the Marine Tertiary. Could not reach the Northern Lignitic Strata on account of hard rock met.

To Accompany the Report
—of—
E. H. Wilson.
Dated June. 1881.

GENERAL & DETAIL DRAWINGS
OF
BORING APPARATUS
to accompany report
OF
Asst. Engr. J.W. NIER to
MAJOR CHARLES R. SUTER
CORPS of ENGR.




STIRRUP.
MAIN POSTS.
ARRANGEMENT OF LEVER & CATCH FOR RELEASING PIPE.
VIEW OF HOOK & CHAIN.
ARRANGEMENT OF TOOLS FOR SINKING PIPES.
SCALE OF BORING TOOLS & DETAILS EXCEPT SHOES.
SCALE OF SECTION & PLATFORMS.



47TH CONGRESS, 1st Session. } SENATE. { Ex. Doc. 10, Part 2.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING

A communication, of the 12th, instant, from Mr. James B. Eads, a member of the Mississippi River Commission, expressing his reasons for non-concurrence in certain portions of the report of said commission.

APRIL 27, 1882.—Ordered to lie on the table and be printed.

WAR DEPARTMENT,
Washington City, April 26, 1882.

SIR: In connection with the progress report of the Mississippi River Commission, which report was transmitted to the Senate on December 14, 1881, I have the honor to transmit herewith a communication, dated the 12th instant, from Mr. James B. Eads, a member of said commission, expressing his reasons for non-concurrence in certain portions of the report above referred to.

Very respectfully, your obedient servant,

ROBERT T. LINCOLN,
Secretary of War.

The PRESIDENT *pro tempore*
of the United States Senate.

General Q. A. GILLMORE, U. S. A.,
President of the Mississippi River Commission:

SIR: I feel compelled to withhold my signature from the last annual report of the Mississippi River Commission, as I differ with the views expressed therein on the following important points:

LEVEES.

In the report the following paragraph occurs:

"It is considered by all that levees, by confining the flood waters of the river within a comparatively restricted space, do tend, in some degree, to increase the scouring and deepening power of the current. But the extent and potency of their influence in the improvement of the low-water channel, in respect to which, for the purpose of navigation merely, improvement is most needed, and their value, for that purpose, as compared with other methods of improvement, and as compared with their cost, are regarded as subjects requiring further observation and study, and the accumulation of further and more comprehensive data, before final conclusions can be reached concerning them."

The effect of this paragraph is to weaken the recommendation made by the commission in its report of February, 1880, with regard to the importance of closing the gaps in the levees. The report of 1880 states that—

"The views of the several members, however, are not in entire accord with respect to the degree of importance which should be attached to the concentration of flood

waters by levees as a factor in the plan of improvement of low-water navigation which has received the unanimous preference of the commission."

My views regarding the important agency of the levees in improving the *low-water* channel of the Mississippi were not expressed in that report with the degree of emphasis which I then desired, and I am unwilling to commit myself now to any expression in the present report which, in the slightest degree, tends to throw a doubt upon *the necessity* of or to justify any further delay in the closing of these outlets. On the contrary, I deem it proper to urge with redoubled force the absolute necessity of their immediate closure.

From quotations hereinafter made from the previous report of the commission, it will be seen that it relies upon the increased volume of discharge for scouring more deeply the bed of the river and lowering its floods. The loss of its volume through outlets or crevasses is fully recognized in that report as the cause of the deposition of sedimentary matters in the bed of the river, by which its flood surface is raised from year to year.

Observations made by the commission plainly show that the effect of the present gaps in the levees has been to raise the flood line of the river many inches above any heights previously attained within the 700 miles in which they exist most numerously, between Natchez and the mouth of the Ohio River. Within this distance there have occurred during the last eighteen years innumerable crevasses, aggregating, in 1875, a length of about 100 miles, and throughout this part of the river the deposits have raised its bed so much as to greatly injure navigation, and to cause smaller floods to rise to heights never before attained.

This question is of such vast importance, and in view of my dissenting from the report of the commission, I trust that I will be pardoned for explaining at some length the general principles underlying the plan of improvement recommended by the commission, and the relation which the levees have to that plan. It should be born in mind that this plan is only applicable to the rectification of a sediment-bearing river, and not to rivers flowing through rocky beds, and whose waters are clear. It should be especially noted, also, that this plan, when fully executed, will render the further use of levees almost if not entirely unnecessary. A more ready understanding of the principles upon which it is based will be had by first briefly describing the formation of the lower or main alluvial basin of the river.

This basin extends from Commerce, Mo. (a few miles above the mouth of the Ohio), to the Gulf of Mexico, and has an average width of about 60 miles. Its length is about 600 miles in a direct line, and it contains about 34,000 square miles, or an area equal to that of the State of Indiana. At the upper end of the basin a spur of the Ozark Mountains has been cut through by the river at the town of Commerce, and through this, over a rocky bottom, 6 or 8 miles in length, the Mississippi now flows. Forty miles above Cairo, on the Ohio River, the same spur has been cut through by that tributary. Throughout this entire basin, bounded by highlands on each side, we have every reason to believe that an estuary of the Gulf of Mexico once existed similar to the Gulf of Saint Lawrence; or to the Rio de la Plata, which is now being filled and built up by the immense mass of deposits annually poured into it by the Parana and Paraguay Rivers. The floods of the Mississippi River, being highly charged with sedimentary matter, have filled this ancient and extensive estuary with alluvial deposits to the height of about 300 feet above the sea at the upper end of the basin. The surface of the land thus made by the river has a comparatively regular descent from the upper end of the basin to the gulf, being at Gaines's Landing, midway to the gulf, about 140 feet above the sea. Through these deposits the river winds its tortuous course in a channel about 1,150 miles long.

Experience and observation prove most conclusively that the quantity of solid matter which the water of the river is able to hold in suspension is strictly regulated by the velocity of the current. Therefore, during the natural process of this land formation, whenever the flood waters escaped over the banks of the channel, the loss of current in the water thus escaping caused the sandy or heavier portions of the solid matter held in suspension in it to settle almost immediately on the submerged banks; while the argillaceous and lighter portions, which take longer to settle, were carried back by the feebler current to the swamps or lower lands, on which they were deposited over a much more extensive area. These lighter matters now constitute the blue and other colored clay strata which are found in all parts and at all depths of the basin. The river banks were thus kept constantly higher than the lands more distant from the stream. Before any levees were built on them they were usually from 10 to 15 feet higher than the lands 1,000 or 2,000 yards distant from the river.

The size of the flowing volume of any river constitutes, as will be seen hereafter, a very important element in determining the velocity of its current; and as the loss of volume over the natural banks has the effect of producing a more sluggish current in the main channel, a deposition of sediment resulted wherever this loss occurred.

In this manner the bed of the stream, during each successive flood, was built up

higher and higher; while the water escaping over the banks built them up also. Thus the river and its banks were both gradually elevated above the neighboring lands, until some important breach occurred in one or the other bank and caused the river to seek a new channel through or over the lower lands. Illustrations of this process are frequently occurring at this time in the lower part of the basin. Sixty miles above the mouth of the river its flood surface is now 7 or 8 feet higher than the mean level of the gulf; and through this 60 miles it flows to the sea between narrow banks that have been elevated by repeated overflows above the sea level. From time to time the river has broken through these narrow embankments and found a steeper and shorter route to the salt water. Through such new route its heavily-laden waters bear immense quantities of sediment, which is deposited in the Gulf at the mouth of the outlet, because the current can carry it no farther. About 35 miles above the mouth one of these outlets, known as "The Jump," occurred about forty years ago. It has already formed over 100 square miles of territory, upon which rice plantations exist and on which trees are growing larger than a man's body. From 6,000 acres of this land, purchased from the State of Louisiana, were obtained nearly all of the willows used in the construction of the jetties. The gradual enlargement of this subdelta has so lengthened the outlet and flattened the surface slope of its branching channels that the current from the river through them, even in flood time, is now too sluggish to carry the heavy sedimentary matters of the main river by that route to the sea; and hence this outlet is gradually closing up. When it first occurred the water in it was 100 feet deep, now it is scarcely 4 or 5.

During this land-building process of the river outlets were doubtless formed, from time to time, throughout the entire 600 miles of the basin, in a similar manner to the one described at "The Jump." Occasionally the conditions were such as to cause the entire stream to forsake its old channel, and in this way it was enabled to distribute its deposits throughout the whole width of the basin from bluff to bluff. Cut-offs and crevasses facilitated this distribution, and the elevation of the bed and the banks of the stream gave it the ability to maintain a sufficient height above the adjacent lands to send its earthy matters many miles away from its channel; while the unstable character of its banks enabled it to change its location from time to time, and thus to cover every part of the basin with its deposits.

Levees stop this land-building process, because they restrain the floods within the defined channel of the river; and so long as they are intact, it is impossible for the banks or the bed of the river to be built up to greater heights by the natural process just described. It is an error completely, and often disproved, but still repeatedly advanced by misinformed persons, that rivers confined between levees have a tendency to have their beds elevated, and, as a consequence, to need a corresponding elevation of the levees. The Po and the Rhine, and other rivers in Europe, effectually disprove such assertions. Their channels have been deepened and their floods lowered as a consequence of perfect levees; and this, it will be presently seen, is an inevitable result of the laws which control the phenomena of sedimentary streams wherever they flow in channels made through their own deposits. These principles or laws I will now endeavor to explain.

The term "slope of the river" is used by engineers to indicate the inclination which the surface of the flood bears to the sea-level. When "*the slope*" is referred to without qualification, it means the *flood line* at the various points along the river, and is synonymous with the term "the fall of the river per mile." It has no reference to the slope of *the bottom* of the river. One end of the slope is unalterably fixed by the Gulf of Mexico. Other points in its line may be lowered or elevated to a certain extent by natural or artificial causes.

The force which produces the current is the fall of the water from a higher to a lower level, and the slope is an indication of the amount of this force. Other conditions being the same, the steeper the slope the more rapid will be the current.

The chief element which retards the current is the friction between the water and the bed of the stream. This friction increases as the surface in contact with the water increases, and is, therefore, greatest where the width is greatest, and conversely it is least where the width of the channel is least. Hence it is evident that the velocity of the current may not only be increased by increasing the slope, but also by decreasing the friction. It must be remembered that nearly all of the sedimentary matter transported by the water is carried *in suspension*, and that the quantity carried is in proportion to its velocity. Only a small quantity of it is rolled along the bottom. Hence if the current be checked when its waters are heavily charged with this sediment (as they always are in flood time), *a deposition of a portion of their burden becomes inevitable.* No fact in connection with the river is more thoroughly established than that *the current in flood time cannot be checked in the slightest degree without causing a deposition of some part of the sediment.* Screens of iron wire with meshes one foot square, placed across shoals in the Missouri River, have sufficed to retard the current enough to cause deposits 16 feet deep to be formed during one flood, and in this simple manner new banks have been developed in excessively wide

parts of that river to deepen its channel and lower its slope. Willow screens, first used at the jetties at the mouth of the river for the same purpose, raised the bottom during one flood, over a large area at the head of the passes where it was from 12 to 16 feet deep, almost to the surface of the water, and 70 or 80 acres of land covered with vegetation are now to be seen on the eastern side of the upper end of the South Pass channel that has been thus formed.

I have named three controlling principles which are present in every problem presented by the characteristic phenomena of the river. Each one of these is very simple in itself. It is, however, absolutely necessary to remember each of them to fully comprehend the subject, and to be able to recognize the respective influence of each in creating these phenomena. I will briefly repeat them to more strongly impress their importance. The *first* is the force producing the current. This force is simply the result of the fall of the river from a higher to a lower level. The *second* is the frictional resistance of its bed. The *third* is the intimate relation between the quantity of sediment carried in the water and the velocity of the current. If we increase or decrease the current from any cause, we increase or decrease the quantity of sediment carried by the river. We can increase or decrease the current temporarily by either of two methods; namely, by altering the slope, or by altering the frictional resistance. Therefore, by these two methods the scouring and depositing effect can be produced. If we increase the current during the floods we produce a greater deepening and enlarging of the channel through the shoals, and they are left in better condition during low water, and at the same time we ultimately lower the height of the floods. If we decrease the current we produce shoals and higher floods.

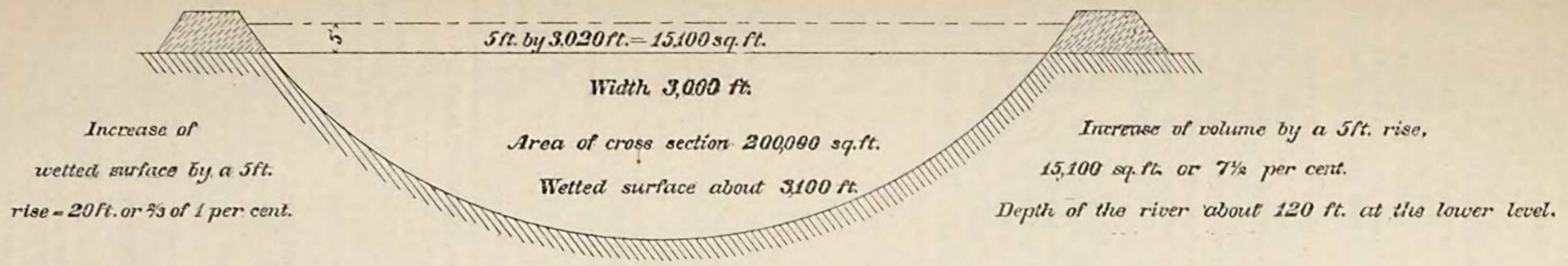
The river, from Commerce to the Gulf, between the levees, is simply a grand trunk into which is poured all of the sedimentary matters of the tributaries. This trunk must discharge as much sediment as it receives, or that which it does not discharge must be left in the channel and thus injure navigation. If it discharges more than it receives, the excess must be taken out of the bed of the channel, and it will be deepened thereby and the floods will be lowered. Hence it follows that by the process of deposit, or scour, the river has the ability to produce a current capable of carrying its sedimentary burden, without loss or gain, to the sea. This velocity of current we may call the *normal* current. In seasons of great floods the *normal* current will be more rapid than when the waters are less highly charged with sediment. This normal current is produced by the river itself as a result of these three controlling principles. Flowing over a bed of deposits from which it takes up additional sediment when the current is too rapid, it thus deepens the bed, and with it the slope, and thus the current declines. If it be too sluggish, deposits fall to the bottom and by raising the bed it increases the slope, and as this is steepened the current is accelerated until the normal velocity is again attained. It follows, therefore, that it is not in the power of man to *permanently* increase its current above the normal velocity. If it be increased from any cause, the water will take up an additional burden from the bed of the river and thus enlarge and deepen its channel, and its slope will be thereby reduced, and with this reduction will follow a reduction of current and the scouring will cease as the current diminishes until the normal rate is attained, and then the channel will be sufficiently enlarged and the slope so lowered as to prevent any further scouring.

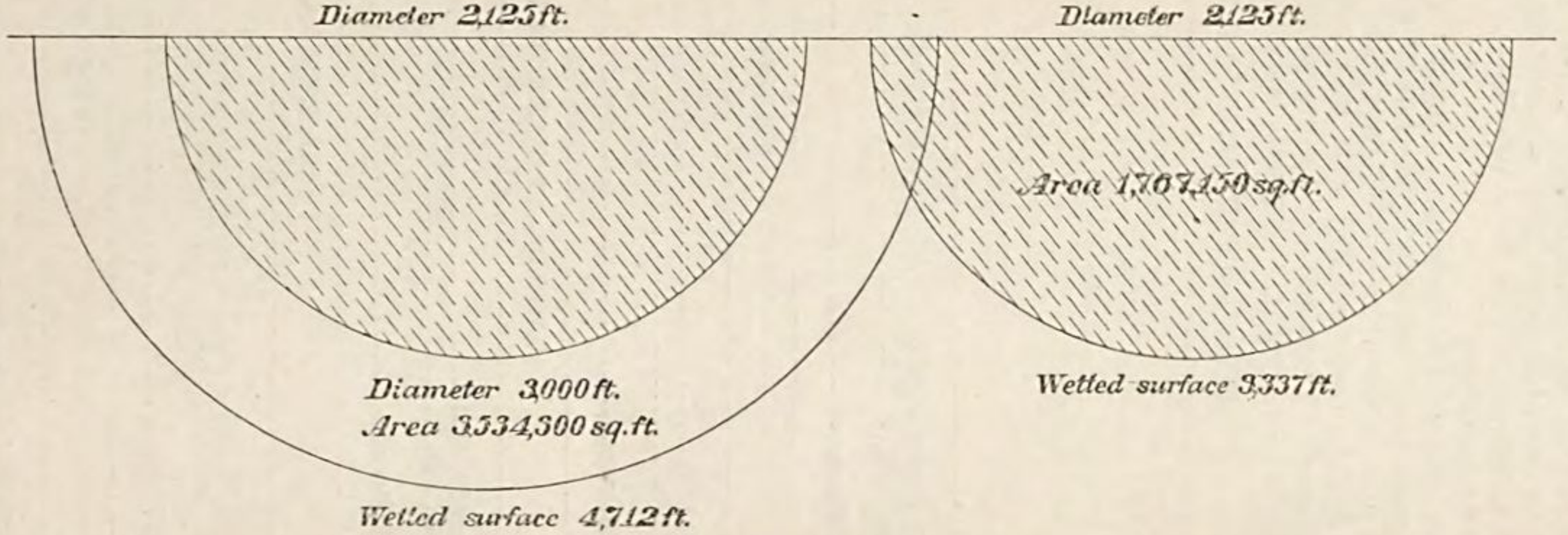
The importance of the levees as a means of improving the navigation of the river comes wholly from the relation which the volume of a sedimentary stream bears to the frictional resistance of the bed. If the volume be diminished, the ratio of friction to the volume will be increased; and, conversely, if the volume be increased, the ratio of frictional resistance will be decreased. Hence, if it can be shown that a higher velocity of current results from the retention of the whole volume within the levees, it must follow that a greater amount of sediment will be transported, and if this amount be greater than that which the tributaries contribute, it must be taken up out of the bed to the benefit of navigation, and the flood line must consequently be lowered to such a degree as will finally reduce the excess of current which the increased volume has produced, down to the normal velocity. The increase of volume which will be secured by the closure of these gaps will produce this increased current.

Through these a large part of the volume of the floods now escapes, and this force the river is expending in its prehistoric occupation of land-building—a process wholly incompatible with the occupation of this vast alluvial district by man. Instead of letting this worse than wasted force be thus employed, the plan recommended by the commission proposes to utilize the entire force of the river to deepen its channel for the safe transit of the immense products of the valley, and for the safe discharge of its entire volume of flood waters without interrupting in any manner the avocations of commerce and agriculture. That it is entirely practicable to retain within the present levees the entire flood discharge of the river, if they be repaired, even without raising them any higher, I will now endeavor to prove.

The relation which the volume bears to the frictional resistance will be readily understood by examining the foregoing diagram. Let us suppose the Mississippi River in flood to be 118 feet deep and 3,000 feet wide, and that an additional rise of 5 feet

APPROXIMATE SECTION OF THE MISSISSIPPI AT CARROLLTON


5'
5ft. by 3,020 ft. = 15,100 sq. ft.
Width 3,000 ft.
Area of cross section 200,000 sq.ft.
Wetted surface about 3,100 ft.
Increase of wetted surface by a 5ft. rise = 20 ft. or ⅔ of 1 per cent.
Increase of volume by a 5ft. rise, 15,100 sq.ft. or 7½ per cent.
Depth of the river about 120 ft. at the lower level.



Wetted surface of the two smaller circles 6674 ft., or 41 per cent. more than the one large circle.

Aggregate area of the two small circles only equal to that of the large one.

then occurs. The increase of friction in this case is only on the two sides of the channel which are in contact with this additional 5 feet of depth. This frictional or wetted surface on the two banks would probably not exceed an aggregate width of 20 feet. The water flowing in the stream before this addition was made to it had a frictional surface of about 3,100 feet in width. The 5 feet additional rise increases the cross-section in such case from about 200,000 to 215,100 square feet, or 7½ per cent., while the friction will have been only increased about two-thirds of 1 per cent.

We see, therefore, that the ratio of friction decreases with an increase of volume, and, as a natural result of this, we must have an increase of velocity of current, and, consequently, an increased capacity of discharge in the stream. But, in addition to the increase of velocity from the diminished friction, the 5 feet elevation materially increases the slope also, and thus adds another cause to increase the current. Carrollton is 120 miles from the Gulf; therefore a 5-foot rise there increases the slope one-half an inch per mile.

The semicircular diagrams are intended to show how rapidly the frictional resistance increases if the river be divided into two or more channels. The large semicircle may be supposed to represent the bed of the main river, its capacity being equal to that of the two smaller ones. The wetted surface or frictional resistance is increased by this subdivision 41 per cent. Hence it is simply impossible for the water to flow as fast in two channels, unless they have steeper slopes, as it would if it all flowed in one channel. This part of the diagram, however, is more particularly intended to illustrate the force of what I have to say later in reference to the closure of the Atchafalaya.

Some idea of the immense increase in the capacity of the river to discharge its floods, as a result of this reduction of friction and increase of slope, may be inferred from a few facts I have tabulated from the exact measurements of Humphreys and Abbot during the floods of 1851 and 1858. They are excerpted from Appendix D of their report. These measurements were made at two places on the river nearly 1,000 miles apart, and when the floods were confined within the levees.

FIRST—AT COLUMBUS, TWENTY MILES BELOW CAIRO.

1858.	Height in feet.	Discharge per second in cubic feet.	Mean velocity in feet.
June 15, 1858, height of river above low water	40.1	1,349,400	8.19
June 28, 1858	38.	1,156,960	7.22
Difference	2.1	192,440	.97
SECOND—AT COLUMBUS.			
June 15, 1858	40.1	1,349,400	8.19
July 1, 1858	33.3	841,487	5.62
Difference	6.8	507,913	2.57
THIRD—AT CARROLLTON, NEAR NEW ORLEANS.			
February 24, 1851	11.8	894,491	5.04
March 17, 1851	14.8	1,152,504	6.22
Difference	3.0	258,013	1.18
FOURTH—AT CARROLLTON.			
February 21, 1851	10.1	766,497	4.41
March 8, 1851	14.1	1,068,464	5.81
Difference	4.0	301,967	1.40
FIFTH—AT CARROLLTON.			
March 19, 1851	14.9	1,149,398	6.19
August 25, 1851	8.1	572,388	3.38
Difference	6.8	577,010	2.81

We see by the first table that when the river at Columbus was 83 feet above low-water mark an additional rise of only 2.1 feet was sufficient to increase the mean current nearly 1 foot per second, and that the discharge was one-sixth greater. The depth of river at the time was about 96 feet. Therefore this 16 per cent. increase of discharge was attained with the addition of only one-fortieth part of its depth.

The second table shows that a decrease of 6.8 feet in the height of the river at this place resulted in a loss of more than 2½ feet per second in the current and a dimunition of 508,000 cubic feet per second in the discharge. If we suppose the banks of the river to have been 90 feet above the bottom of the channel, this table proves that, with levees only 7 feet high upon them, they would retain a sufficiently increased volume to add 60 per cent. to the discharge of the river, and over 45 per cent. to the velocity of the current.

The third table shows that at Carrollton, near New Orleans, an increase of 3 feet in the height of the river added nearly 30 per cent. to the amount which was discharged (almost doubling the percentage of increase shown with a rise of 2.1 feet at Columbus), while the current was accelerated at the same time more than 20 per cent.

The fourth table shows that at 4 feet greater height of the river it discharged 40 per cent. more water and that its current was increased 32 per cent.

The fifth table shows that with a difference of only 6.8 feet the discharge of the river at Carrollton was more than double. The river here at the lowest stage was 115 feet deep. Hence there was an increase of only one-seventeenth part of its total depth required to produce this astonishing difference in the discharge of the river. The velocity was at the same time increased 85 per cent.

These tables are the result of actual observation and careful measurements. They represent stubborn facts, without any theorizing, and they show how absurd are some of the statements made as to the effect of outlets in lowering the floods of the river. For instance, the fifth table shows that when the river (March 19, 1851) was nearly up to the highest water mark known at Carrollton, it would have required an outlet larger than the Mississippi itself to lower it 6.8 feet. Such outlet would have had to discharge 577,000 cubic feet per second, while the whole river could only discharge 572,000 feet when its surface was 6.8 feet lower. This enormous quantity of water (577,000 cubic feet per second) would cover a square mile 1 foot deep in about 48 seconds. In 24 hours it would cover 1,800 miles to the same depth, and in less than a fortnight it would put an average depth of 3 feet over an area as large as the entire State of New Jersey. To lower the river only 2 feet at Carrollton when in flood would require an outlet as big as Red River. This is because such loss of volume lowers the slope and increases the frictional resistance in the main stream below the outlet; and this causes it to flow more slowly, and thus prevents that great reduction in its height which the thoughtless would expect.

When we refer to the three principles governing this problem, and know how thoroughly they are established by experience, observation, and experiment, and remember the intimate relation existing between the *quantity* of sediment carried and the *velocity* of the current, it would seem impossible to arrive at any other conclusion than that the loss of velocity, which invariably accompanies a lower height of the flood line, cannot fail to result in a deposition of sediment in the channel of the river where such loss of velocity occurs during a flood when the water is carrying such an enormous volume of sediment. But this fact does not rely for proof upon the plain deductions to be drawn from a consideration of the three principles we have referred to. The numerous soundings and examinations made of the bed of the river show that below every outlet its channel is reduced in size by the deposits thrown down as a result of the loss of volume through such outlet and the consequent reduction in the velocity of current.

The floods do not come so suddenly but that the increased velocity due to the increased volume is felt many days before the floods rise near the top of the levees, and if these gaps were closed I have no doubt that the increased velocity resulting therefrom would enable the floods to be discharged without any danger of their over-topping the present levees. It is possible that some very extraordinary flood, if it occurred the next year after they were closed, might break through them or escape at some one of the lowest points in them; but extraordinary floods are exceptional, and it is altogether possible that before another one comes the channel of the river would be restored to the dimensions which it had when these levees were intact, and when they were capable of discharging any one of the ordinary floods which occurred.

If they be left open, new shoals and injurious changes in the channel will be occurring at other points of the river than those selected by the commission for immediate improvement, and these new obstructions and changes in the channel will require so much more additional work, and this will undoubtedly cost twice or thrice as much as it will to repair the levees. By repairing them the channel will not only be prevented from becoming worse at any point on the river, but the shoaling which has occurred as a result of these outlets will be removed by the effect of the levees, and the works of improvement can then be limited to the reduction of the excessively wide places

which now exist, and which are inclosed by the present lines of levees. These wide places are the cause of cut-offs, caving banks, shifting channels, and vexatious shoals.

The plan of improvement recommended by the commission differs from any other previously proposed for the correction of the channel, in the fact that it looks to a rectification of the *high-water channel*, by the ultimate narrowing of these wide places, as the *only* method by which a deep and uniform low-water channel can be permanently secured.

The wide places in the high-water channel create alternations of current velocity and steeper slopes to overcome the excessive frictional resistance. These cause the water to be highly charged with sediment at one part of its journey to the sea, and much less highly charged at others. This creates scouring and depositing in the bed, and radical changes in the channel by the caving away of its banks. By reducing these wide places to a width approximately the same as that of the narrow parts of the river, the friction is reduced, a lower slope and more uniform depth will be obtained, and the velocity of current will not be subject to its present changes. A uniform charge of sediment will result from uniformity of current velocity, and the caving of the banks will then be practically arrested, for the reason that when the water has the full charge of sediment due to its velocity it can carry no more, and cannot, therefore, scour the channel more deeply, by which the undermining of the banks is effected. Permanence of channel will not therefore be secured until these excessive widths are reduced. A less depth at low water than 20 feet will not insure stability of channel, for the reason that a less depth will result from only a partial reduction of the wide places. *Permanence* of channel will be attained only in proportion as uniformity of width of the high-water channel is attained, and when this is secured the depth at low water may be considerably more than 20 feet, but it will certainly not be less. The sooner these wide places are corrected, the less will the improvement of the river cost. The maintenance of the levees, as far as they may be necessary to control the floods, will greatly lessen the cost of the work, because the retention of the water within them will prevent new shoals from forming during the narrowing of the wide places, and because the larger is the volume of a silt-bearing river *in flood time* the deeper will be its channel. Through the 330 miles below the mouth of Red River the river has a comparatively uniform width, and the caving of the banks is very slight as compared with the changes occurring in the 820 miles above Red River. In conclusion, I may say that what I have urged here in regard to the closing of these gaps is but a repetition of an argument made by me before the Committee on Commerce of the House six years ago. In closing my address to the committee, I then said:

"There can be no doubt of the entire feasibility of so correcting the Mississippi River from Cairo to the Gulf that a channel depth of 20 feet during the low-water seasons can be permanently secured throughout its entire course, and that the alluvial lands on each side of its waters can be made absolutely safe from overflow without levees by such correction. This can be accomplished for a sum entirely within the ability of the government, and one really insignificant when compared with the magnitude of the benefits which would flow from such improvement. *Until such work is accomplished an annual expenditure for the maintenance of the levees is imperative.*"

THE ATCHAFALAYA.

I cannot agree with the recommendations of the commission for the correction of the river at the mouth of Red River. The report sets forth the following facts:

"The enlargement of the Atchafalaya has steadily progressed since the removal of the raft therefrom by the State of Louisiana. Now it has a capacity of discharge nearly equal to Red River, and affords a line of least resistance for the flow of that stream to the sea. The discharge of Red River into the Mississippi is now small and infrequent. The outlet from the Mississippi to the Atchafalaya is almost constant, and at times very large. The elevation of the water surface at the junction of Old River and the Mississippi (that is, the old mouth of the Red River) is almost constantly above that at the head of the Atchafalaya, the difference, on the 13th of last October, being 7.3 feet in the distance of about 5 miles. There is a marked tendency to increase this difference of level, and also to enlarge both the communication between the Mississippi and the Atchafalaya and the Atchafalaya itself."

The recommendations of the commission to which I object are as follows:

"We therefore recommend that at the earliest possible time a continuous brush sill be laid across Old River, between Turnbull's Island and the Mississippi, at such point as surveys show to be advisable, with the object of checking the enlargement of the outlet from the Mississippi at that point.

"We also recommend that the study of the subject be continued, in order to ascertain, first, the expediency of completing the divorce between the Mississippi on the one hand and the Red and Atchafalaya on the other."

It seems to me that these recommendations completely ignore the principles under-

lying the general plan of improvement recommended by the commission. In its report, dated 17th February, 1880, these principles, in their relation to islands, are thus set forth:

"It is a well-established law of hydraulics that the ratio of frictional resistance, per unit of volume, increases if the sectional area be diminished. Thus, if the volume of a river were suddenly divided by an island into two channels, the water flowing in them would encounter more frictional resistance than it met with while flowing in a single channel. Hence, the currents through these channels would be more sluggish, and, as the water is charged with sediment, the sluggish current would cause a deposit in the channel, which would first begin at their upper ends and would continue until the bottoms of the two channels would be so steepened that the current would attain a velocity capable of carrying the suspended sediment through them without further deposit, and the slope of the river's surface in flood time would be found to be steeper through them than above and below where the volume flows in a single channel."

When the Atchafalaya was made, it formed an island, which is bounded by the Atchafalaya, the Mississippi, and the Gulf of Mexico, and it conforms precisely to the conditions set forth in the above extract. The report just referred to further says:

"In the case of a crevasse, an island is also formed, having the main body of the river on the one side and the crevasse channel on the other side. As the volume flowing in the main channel below a crevasse has been decreased by the amount drawn off through it, a steeper slope in the main river, if the crevasse be kept permanently open, becomes inevitable, because the shoal below the outlet, as it grows in length down stream, from the deposition of successive floods, gradually increases the frictional resistance of the volume flowing through that diminished channel, and this tends to check the current of the river *above* the crevasse, and thus the shoaling of the river bed and the raising of the flood line above the site of the outlet ensues as a secondary and permanent effect.

"It is in this way that silt-bearing streams, flowing through alluvial deposits, have the ability to increase or steepen their surface slopes, and thus recover the velocity of their currents, and adjust them to the work of transporting the sedimentary matter, with which the flood waters are charged, so that this matter may be carried without loss or gain.

"In proof of the correctness of these views, and of their full accordance with well-established hydraulic laws, we have the evidence of this relation between slope and volume presented in the phenomena of silt-bearing streams all over the world. Whenever such streams flow through alluvial deposits, other conditions being the same, the slope is least when the volume is greatest, and, conversely, the slope is found to be invariably increased as the volume is diminished."

There are no truths in science more capable of complete demonstration or more generally recognized by hydraulic engineers than these, and *the effects* already created by the Atchafalaya, and which are contained in the present report, bear ample testimony to the soundness of the deductions thus advanced. For instance, the volume in the main river, below the Atchafalaya outlet, is decreased by the volume carried off through the Atchafalaya, therefore, in proportion, as the Lower Mississippi has lost this volume, according to the principles laid down by the commission, the slope of the river or its flood line should be steepened, for the commission correctly says:

"The slope is found to be invariably increased as the volume is diminished."

The last report of the commission says:

"No decrease of flood heights on the Mississippi, from which volume has been abstracted, is observable as the result of increased outlet, in the gauge records at Natchez, Red River, or Baton Rouge, although it practically amounts to a diversion of a tributary with about one-sixth of the flood discharge of the Mississippi."

In other words, the Mississippi, below the Atchafalaya, is to-day carrying one-sixth less than it did formerly; and yet no diminution in its flood line is observable at these points below the outlet. No better evidence could possibly be given of the fact that the bed of the main river, below the Atchafalaya, has gradually been filled with so much deposit under the influence of the depleting effects of the Atchafalaya, that only five-sixths of the former flood volume is all that is now required to bring the surface of the floods to the same height on the levees that they attained when the main river received the volume of the Red River.

The report states further:

"But such a decrease of flood elevation has been observed in the Atchafalaya, to which the volume abstracted from the Mississippi has been added."

When we refer to the principles adopted by the commission we find it stated:

"Whenever such streams flow through alluvial deposits, other conditions being the same, the slope is least when the volume is greatest."

The volume has been steadily increasing in the Atchafalaya, and, as a natural result of such increase, its slope has diminished. It now carries off the volume of the Red River and a portion of the Mississippi water, and the commission state as a fact that "a decrease of flood elevation has been observed in the Atchafalaya."

This is precisely in accordance with the principles adopted by the commission, and these facts conclusively prove "the inexpediency of completing the divorce between the Mississippi, on the one hand, and the Red and Atchafalaya Rivers on the other." There is no need of further study, it seems to me, upon the question of such divorce; but on the contrary, there is every reason for *immediate action* to prevent not only the further loss of volume from the Mississippi, but to restore to it the discharge of Red River, which is now going down the Atchafalaya. It wonld probably not be advisable to reduce the cross-section of the Atchafalaya to restrain more than about one-sixth of its volume per annum, which would thus occupy six years in its complete closure; although the tables I have already given of the discharge of the river at Columbus and Carrollton show that the entire discharge of the Red, if added to the Mississippi when both are in flood, would only increase the height of the Mississippi two feet below the Red River. The steepening of the slope of the Mississippi below the Atchafalaya has been progressing ever since that outlet began to be enlarged, and, as an immense amount of deposit must have fallen on the bed of the stream to raise the bottom of the river so high that the abstraction of one-sixth of its original volume produces no reduction in the height of its floods, the removal of this deposit should be made gradually. If it be permitted to rob the Mississippi of this great tributary permanently, by the construction of the proposed sill, we may be certain that a further raising of the flood line of the Mississippi will be the consequence, not simply *below this outlet, but above* it also. Of course, if the capacity of the crevasse be increased, as in this instance, additional shoaling will occur in the bed below it. It is not easy to foretell exactly how long the secondary effect (that of shoaling *above* the outlet) will continue. The diminution in the capacity of the channel below the outlet increases the frictional resistance, because *the ratio* of friction increases as the volume is diminished. But *the amount* of this additional resistance increases as the shoaling extends on down stream, for the same reason that a long pipe of a given capacity and slope will not discharge as much water in a given unit of time as a shorter one with the same head, diameter, and slope. Hence, although the channel is diminished by deposits immediately below an outlet during the next ensuing flood, yet this shoaling may not extend sufficiently far down stream to react perceptibly upon the current *above* the crevasse, until after successive floods have still further extended the shoaling and thus lengthened, as it were, the diminished channel through which the river then flows. The raising of the flood line *above* the outlet, by which an increased slope is given to the river *below it*, is, however, only a question of time, if the outlet remain in full force. It will gradually raise the floods higher and higher above the outlet, until a steeper slope below it restores the normal current. The slope of a sediment-bearing stream is adjusted by laws as immutable as those which control the planets, and a further flood elevation above this outlet, if the volume of the Red River be lost to the Mississippi, is inevitable. To me it seems that no treatment of the river is more plainly indicated by the observed facts than that which I have the honor to recommend upon this subject. I have not the least doubt in my own mind that the complete closure of the Atchafalaya will produce a lowering of the flood line, at the mouth of the Red River, of several feet, within a few years afterwards. The prevention of the escape of any portion of the discharge of the Red River down the Atchafalaya will also have the effect of benefiting the navigation at the mouth of Red River; it will restore deep navigation between the Red and the Mississippi River, without the necessity of further works. Communication between the Atchafalaya and the Mississippi, by a system of locks, will become a necessity before the complete closure of that outlet, but these would also be still more needed if the Red and Atchafalaya be separated from the Mississippi, as the commerce of the Red River must then be provided for also. The lowering of the slope, which will certainly follow the closure of this outlet and the reunion of the Red and Mississippi, will benefit the river channel and lower the floods so materially throughout the entire 820 miles of river between Commerce and Red River, that the saving in the cost of maintenance of the levees during the correction of this part of the river will enormously exceed the cost of the works, including the locks for the Atchafalaya; besides, it will give to the extensive region between the Red River and Commerce much more complete immunity from overflow, by the enlargement of the Mississippi River below the Atchafalaya; while the Atchafalaya country will be made safer and safer in proportion as the head of that stream is closed.

Instead of constructing the sill to interrupt communication between the Mississippi and the Atchafalaya, I would, for the reasons given, earnestly recommend the immediate construction of a sill in the Atchafalaya, near its upper end, to diminish the volume flowing through that outlet; and, from year to year, as rapidly as may be deemed safe, cause this sill to be built up until it shall finally constitute a dam, completely separating the Atchafalaya from all communication with the Red and Mississippi Rivers. The result of this will be to increase the volume flowing in the main river, and improve the depth of water on bars below the Red River, on which, at low water, only ten feet depth now exists.

HARBOR OF VICKSBURG.

The report recommends that the improvement of this harbor be attempted by revetting Delta Point against further erosion, and by dredging out a basin and a channel leading to the harbor, by which steamers will have access to Vicksburg landing. The first cost of this dredging is estimated at $336,000, and the revetment of Delta Point at $100,000 more. I do not believe Delta Point can be permanently revetted for an additional $100,000. Two hundred and twenty-nine thousand dollars have been heretofore appropriated for this purpose, and, as the report declares, this work, "owing to many unforeseen difficulties, has been much more costly than was anticipated." The failure to successfully revet and maintain this point will increase the estimated cost of dredging the channel and basin proposed in the report.

My experience has taught me that of all methods of deepening channels in, or connected with, the Mississippi River that of dredging is one of the most costly, uncertain, and least permanent. The plan proposed, if carried out *successfully*, would entail upon the government *an annual expenditure* for the dredging of this basin and canal, which would, no doubt, equal one-eighth, and most likely one-sixth of its first cost, or at least $40 000 per annum. This would represent the interest on at least a million dollars, and with the first cost of the work would make this plan of improvement cost about a million and a half dollars. For this sum, and perhaps for much less, the river can be made to resume the channel it followed thirty or forty years ago, when it washed the shore of Vicksburg, and before it created the extensive bend now cut off by the new channal, at the foot of which bend the city of Vicksburg stands. I should not attempt to restore the channel around De Soto Island, but simply extend Delta Point until a sufficient portion of the island is cut away to force the channel against the wharf. This method of improvement would make the river flow in a permanent channel at Vicksburg, and save its citizens from the uncertainty which would attend the maintenance of a channel and harbor by dredging, and from the certain injury to the commerce of that city and to that of a large district dependent upon it for the conveniences of shipment, in the event of Congress failing at any time hereafter to make the regular annual appropriation which would be required for dredging out the proposed channel and basin. I do not believe the plan recommended will be attended with satisfactory results if it be executed.

For these reasons, and because I know it is practicable to extend Delta Point artificially to a sufficient distance to throw the channel against the old landing at Vicksburg, I recommend that this work be undertaken for the permanent rectification of the river at this place. Approximate estimates made by me show that this can be accomplished for $1,200,000, and deep water permanently secured at the Vicksburg wharf without further outlay for maintenance. Two hundred and fifty thousand dollars could be profitably expended upon this work during the ensuing year.

IMPROVEMENTS BETWEEN THE MOUTHS OF THE MISSOURI AND OHIO RIVERS.

The commission, in its report, in speaking of the improvements now being carried on by the War Department, between the mouths of the Missouri and Ohio Rivers, a distance of about 200 miles, says:

"The success of Captain Ernst's works thus far justifies, in our opinion, the methods he has employed, and we are of the opinion that it should be pushed toward completion under liberal appropriations."

I cannot join with the commission in this indorsement and recommendation, for the reason that the plans now being executed by Captain Ernst have never been submitted to me for examination. I have been informed that a committee, appointed by the commission, did examine these plans and approve them; but so far as I know they were never submitted to the commission itself.

Before I would feel justified in giving my approval to detail plans for the improvement of any portion of the river, it would be necessary for me to carefully consider them, not merely in the light of the immediate results which the works might be expected to accomplish, but also as to their effect upon other parts of the river. It would also be necessary to know whether the plans proposed for the special locality were in full accord with the general plan of improvement recommended by the commission, and, assuming the plans to be correct, whether they were to be carried out with due regard to economy in the expenditure of money.

Under the act of Congress creating the commission, it is charged with the responsibility of reporting plans for the improvement of the entire river, and it alone is responsible for them. I do not believe the public expectation will be met by exempting so extensive and important a section of the river as this two hundred miles from the supervision of the commission. This was done by a clause in the last appropriation of $600,000 for this part of the river, and the effect of the present recommendation is

to encourage the disbursement of a like sum without any control of the works by the commission.

I do not desire to be understood as condemning the plans which are now being executed by Captain Ernst; but I cannot unite with the commission in indorsing them, for the reasons stated.

Very respectfully,

JAS. B. EADS.

WASHINGTON, D. C., *April* 12, 1882.

47TH CONGRESS, 1st Session. } SENATE. { EX. DOC. No. 11.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING

A communication from the Chief of Engineers, dated the 13th instant, covering copies of reports from Capt. A. N. Damrell, Corps of Engineers, upon examinations and surveys of Holmes Creek, Chipola, Finholloway, East Bay, and Blackwater, Ocolockonnee, Aucilla, and Wacissa rivers, in the State of Florida.

DECEMBER 15, 1881.—Referred to the Committee on Commerce and ordered to be printed.

WAR DEPARTMENT,
Washington City, December 14, 1881.

The Secretary of War has the honor to transmit to the United States Senate, for the information of the Committee on Commerce, a communication from the Chief of Engineers, dated the 13th instant, covering copies of reports from Capt. A. N. Damrell, Corps of Engineers, upon examinations and surveys made in compliance with provisions in the river and harbor act of June 14, 1880, at Holmes Creek, Chipola River, Finholloway River, East Bay, and Blackwater River, Ocolockonnee River, and Aucilla and Wacissa rivers, all in the State of Florida.

ROBERT T. LINCOLN,
Secretary of War.

The PRESIDENT *pro tempore*
of the United States Senate.

OFFICE OF THE CHIEF OF ENGINEERS,
UNITED STATES ARMY,
Washington, D. C., December 13, 1881.

SIR: I have the honor to submit herewith copies of reports to this office from Capt. A. N. Damrell, Corps of Engineers, of the results of examinations and surveys of the following rivers in the State of Florida, made under his direction, to comply with requirements of the river and harbor act of June 14, 1880, viz:

1. Holmes Creek;
2. Chipola River;
3. Finholloway River;
4. East Bay and Blackwater River;
5. Ocolockonnee River, and
6. Aucilla and Wacissa rivers.

Very respectfully, your obedient servant,

H. G. WRIGHT,
Chief of Engineers, Brig. and Bvt. Maj. Gen.

Hon. ROBERT T. LINCOLN,
Secretary of War.

EXAMINATION OF HOLMES CREEK, FLORIDA.

UNITED STATES ENGINEER OFFICE,
Mobile, Ala., August 26, 1881.

GENERAL: I have the honor of submitting report upon the examination of Holmes Creek, Florida, provided for by act of Congress approved June 14, 1880, and assigned to me by letter dated June 17, 1880.

The examination was carried from its junction with the Choctawhatchee River to Vernon, the county seat of Washington County, about 35 miles.

The river was found to have abundant width and depth for such boats, not exceeding 100 feet in length, as would be needed to transport the produce of the adjacent country.

The obstructions to navigation are snags and overhanging trees. The estimated cost of their removal is $5,000.

Five steamers have been engaged in the trade on the river. Such statistics of the amount of commerce as could be obtained are appended. The population of the valley is about 3,000.

Very respectfully, your obedient servant,

A. N. DAMRELL,
Captain of Engineers.

Brig. Gen. H. G. WRIGHT,
Chief of Engineers, U. S. A.

REPORT OF MR. HIRAM HAINES, ASSISTANT ENGINEER.

MOBILE, ALA., *December* 22, 1880.

SIR: I have the honor to submit the following report upon the examination of Holmes Creek, Florida, made in obedience to your instructions.

The examination extended from its confluence with the Choctawhatchee River to within a few miles of Vernon, the county seat of Washington County, about 35 miles, and for that distance I find the stream to possess ample capacity of volume for navigation with steamboats and barges not exceeding 100 feet in length. Its width varies from 50 feet to 300 feet, and, with the exception of a single locality, at the mouth of a cut-off from the Choctawhatchee River, below Boynton's Landing, its depth at low-water exceeds 10 feet. It is bounded on either side, almost continuously, by an overflowed cypress swamp, with an occasional bank of a few feet in height reaching its margin and serving as a landing. The bed of the Creek is but little obstructed by snags, the current being slow and the adjacent timber being cypress, springing generally from a considerable depth under water; is usually erect in its growth, and presents but few obstacles in the form of inclining trees. The principal work required to admit of the passage of boats of the size stated, to Vernon, will be removing overhanging limbs, occurring at narrow parts of the stream and in the short bends.

I take occasion to remark here that in tortuous and narrow streams it is far more frequently the case that overhanging limbs in the bends obstruct the channel and embarrass the working of a boat around a point than when such obstacles occur on the point itself.

For this work I have estimated that $5,000 will be ample. The construction of a brush-dam across the cut-off referred to belongs properly to the Choctawhatchee River work, and is, therefore, not included in this estimate.

The following are the names and dimensions of steamboats that have been engaged in the commerce of this river: Bloomer, stern-wheel, 100 feet long; Magnolia, propeller, 70 feet long; Minta, side-wheel, 73 feet long; Ella May, propeller, 100 feet long; Lula Burns, propeller, 31 feet long.

The improvement of Holmes Creek will aid materially in the development of an extremely fertile section of country, known as Holmes Valley, having a population of about 3,000, and producing largely of cotton and sirup.

Very respectfully, your obedient servant,

HIRAM HAINES,
Assistant Engineer.

Maj. A. N. DAMRELL,
Captain, Corps of Engineers, U. S. A.

STATEMENT OF THE COMMERCE OF HOLMES CREEK, FLORIDA, FOR YEAR ENDING JUNE 30, 1881, AS NEAR AS COULD BE ASCERTAINED FROM THE MERCHANTS OF THAT LOCALITY.

	Value.
450 bales cotton	$22,500
6,000 bushels potatoes	3,000
400 barrels sirup	4,800
Timber	2,000
Miscellaneous produce	5,400
Total	37,700

This statement does not embrace the values of the agricultural products of the whole region of the country contiguous to Holmes Creek, as by far the greater part of it finds transportation to market by other means. The improvement of this stream as recommended would not only largely increase its commerce, but would also have a tendency to promote the agricultural development of this the most fertile region of country in West Florida.

EXAMINATION OF CHIPOLA RIVER, FLORIDA.

UNITED STATES ENGINEER OFFICE,
Mobile, Ala., August 26, 1881.

GENERAL: I have the honor of submitting the following report upon the examination of the Chipola River, Florida, authorized by act of Congress approved June 14, 1880, and assigned to me by letter dated June 17, 1880.

The examination extended from the road-bridge, one-half mile southeast of Mariana, the county seat of Jackson County, Florida, to its junction with the Apalachicola River.

The river was formerly navigated by steamboats and barges, transporting cotton from Mariana to Apalachicola.

The present obstructions to navigation consist in numerous shoals in the upper part of the river, and cypress timber in the lower part, but in both cases improvement can be easily made.

The estimated cost of the improvement of this river from Mariana to the Apalachicola River by the way of the Chipola cut-off, so as to render it navigable to boats 100 feet long, 20 feet beam, and 2½ to 3 feet draught, is as follows:

12,000 cubic yards of loose rock, at 50 cents	$6,000
1,000 cubic yards of solid rock, at $2	2,000
750 linear feet wing-dams, at $2	1,500
Removal of trees	5,000
Appliances, engineering, and contingencies	6,500
Total	21,000

* * * * * * *

Very respectfully, your obedient servant,

A. N. DAMRELL,
Captain of Engineers.

Brig. Gen. H. G. WRIGHT,
Chief of Engineers, U. S. A.

REPORT OF MR. HIRAM HAINES, ASSISTANT ENGINEER.

MOBILE, ALA., *March* 18, 1881.

SIR: I have the honor to submit the following report upon the examination of the Chipola River, Florida, made in pursuance with your instructions.

The Chipola River has its principal sources in Geneva and Henry counties, Alabama, and, flowing through Jackson and Calhoun counties in Florida, unites with the Apalachicola River about 35 miles above the town of Apalachicola.

The examination of the river was begun at the road-bridge, one-half a mile southeast of Mariana, the county seat of Jackson County. Here the stream is 100 feet in width and has an average depth of 4 feet at low-water, with a middle surface velocity of 160 feet per minute. For the first 5 miles it is fringed on either side with swamps or low lands, subject to overflow. Beyond the narrow strip of low land the country rises almost abruptly to an elevation of about 150 feet, spreading out with undulating surface, partly under cultivation, but mostly lying at waste or covered with an original growth of pine and oak. As we descend the stream for the next 40 miles, its margin becomes better defined; abrupt banks take the place of swamp, while the country upon either side loses its undulating character and becomes flat. There is little irregularity in the width of this part of the river, except at the islands or shoals, the increase being gradual until 150 to 200 feet is attained. A few miles below Abe Springs the river again enters a swamp, which merges into the head of Dead Lake, which is itself an overflowed cypress swamp of 1 to 2 miles in width and 15 miles long.

The current now becomes barely perceptible, and it is with considerable difficulty that the channel is distinguished from the numberless arms that make out from it, and terminate, at a greater or less distance, in impassable thickets of cypress trees or accumulations of drift. It is, however, generally deep and spacions, and occasionally approaches the main land on one side or the other, thus affording access to it for the produce of the country contiguous to the lake.

The obstructions to navigation consist in numerous shoals in the upper part of the river, the positions of which are shown in the accompanying maps, and the occasional contraction of the channel through the lake by encroachments of the cypress timber. In neither case, however, are the obstructions of a formidable character. The shoals are formed by the intersection of the stream with some of the rocky strata of the Tertiary formation, which have a dip corresponding in direction, and an inclination but slightly exceeding that of the fall of the river. Generally the rock is broken up and may be easily removed, or the shoal may be overcome by wing-dams, and, as in no case is there less than 2 feet of water in the channel through them at its lowest stage, but little work of deepening will be required for the class of boats suitable for the commerce of the river. The overhanging trees are few, owing to the nature of the banks, which in the upper part of the river are commonly supported by rocky strata, and through the swamp they are generally remote from the channel. With the exception of an assemblage of short bends about 3 miles above Abe Springs, known as "The Seven Points," and a few other isolated instances, the course of the river is straight or with easy bends, and, except at the shoals referred to, there is ample depth of water, generally, from bank to bank.

But little rectification of its alignment will therefore be necessary in this part of the river. Wherever the channel of the lake is contracted, its width may often be made ample by the removal of a single tree, and where the channel is most intricate or tortuous the cypress growth is usually sparse, and disposed in single trees or clumps in such a manner as to admit of all desirable rectification at a small cost.

The river was formerly navigated with barges employed to transport cotton from Mariana to Apalachicola, and two small steamboats, the Farley and Jackson, were for a short time also engaged in this trade. The latter was 100 feet long and 20 feet beam, built at Pittsburgh. The barges were usually from 16 to 18 feet beam, and 80 to 100 feet in length.

The immediate commerce of the river would be chiefly obtained from Mariana and its vicinity, and consists of the ordinary products of the farm, of which cotton would be the principal item. The culture of oranges has been commenced along the borders of Dead Lake to a considerable extent, and the production of this fruit will doubtless at some future time form a commerce in this region of much importance.

It is, however, my impression that far more is to be looked for in the development of the fertile region contiguous to the upper river, which would be largely promoted by such an improvement of the river as would afford a safe and cheap means of transportation.

At present the cotton and other produce of the country is transported in wagons to the Apalachicola River, an average distance of about 30 miles, and thence to Apalachicola or Columbus by steamboat.

Upon investigation, I find that the area of cultivated lands that would be affected by an improvement of the river is about 200,000 acres, with a present population of 20,000, situated in Jackson, Washington, and Calhoun counties, Florida, and Geneva and Henry counties, Alabama. The value of produce and supplies that would seek transportation by the river is estimated to be as follows:

	Value.
10,000 bales of cotton	$500,000
Other farm products	200,000
Timber and saw-logs	100,000
Return freight	600,000
	1,400,000

This estimate, it is thought by competent opinion, would be doubled, should the former production of agricultural values in this region be restored.

The following is an estimate of the cost of improving the river from Mariana to the Chipola Cut-off, so as to render it navigable throughout the year for boats 100 feet long and 20 feet beam, and 2½ to 3 feet draught. I should deem it inexpedient to make any expenditure upon either of the several channels below the junction of the lake with the cut-off, as the cut-off, which is entirely free from obstructions, gives easy access to the Apalachicola River within a distance of 2½ miles, while the work required to render navigable either of the channels connecting with the river below would exceed that of the entire river from Mariana to the cut-off. The distance from the foot of the lake to Apalachicola, by way of the cut-off, would be less than by the Chipola River, while it would, of course, be the channel of communication to all points upon the Chattahoochee and Flint rivers, and the object of the improvement would therefore be fully subserved, so far as present requirements of trade exist, by completing it to this point. The distance from Mariana to the foot of the lake by the river is about 90 miles.

ESTIMATE OF COST.

12,000 cubic yards of loose rock, at 50 cents	$6,000
1,000 cubic yards of solid rock, at $2	2,000
750 linear feet wing-dams, at $2	1,500
Removal of trees	5,000
Appliances, engineering, and contingencies	6,500
Total	21,000

Maps of the river, showing the location and extent of the shoals and the channel through Dead Lake, and also of the lower portion of the river, showing its relation to the Apalachicola River, and index map, accompany this report.

Very respectfully, your obedient servant,

HIRAM HAINES,
Assistant Engineer.

EXAMINATION OF FINHOLLOWAY RIVER, FLORIDA.

UNITED STATES ENGINEER OFFICE,
Mobile, Ala., August 26, 1881.

SIR: I have the honor of submitting the following report upon the examination of the Finholloway River, Florida, authorized by act of Congress approved June 14, 1880, and assigned to me by letter dated June 17, 1880.

The river was found to have but 2 feet depth at low-water at its mouth, the bar there, being formed of mud banks, oyster and rock reefs, extending about 3 miles seaward.

From inside the bar, up about 3 miles, it has a width of from 150 to 200 feet, and from 12 to 15 feet depth, but the channel is crooked, being obstructed by large rocks. In the next mile the river contracts to a width of 100 feet; four miles above the mouth of the river is a ledge of rocks running across with a reported depth of about 2 inches at low-water, and extending up about 3 miles above; this the river expands into a pool called Dead River which extends to the head of the hammock lands, 12 miles from its mouth.

There is an abundance of palmetto, cedar, a nd live oak on the river, in which there is a small business, the logs being floated down.

The amount of the business now carried on could not be ascertained, but is small.

The cost of any considerable improvement would be very great, but no accurate estimate can be made, and it is not believed the importance of the river would justify a survey to obtain data for one.

The report of Mr. Powhatan Robinson, by whom the examination was made, is transmitted herewith, and to it I would respectfully refer, par-

ticularly in connection with his opinion as to the interest to be benefited by any improvement.

Very respectfully, your obedient servant.

A. N. DAMRELL,
Captain of Engineers.

Brig. Gen. H. G. WRIGHT,
Chief of Engineers, U. S. A.

REPORT OF MR. POWHATAN ROBINSON, ASSISTANT ENGINEER.

MOBILE, ALA., *January* 17, 1881.

MAJOR: In pursuance of your orders of October 22, 1880, I have made an examination of Finholloway River, in Northwestern Florida, with a view towards its improvement, and I now have the honor to submit the result of my observations.

The approach to this river, as to most rivers on this coast, is obstructed for about 3 miles seaward by mud banks, oyster beds, and, in this particular case, rock reefs. A vessel cannot carry more than 2 feet draught over the bar at low-water, but by waiting from 12 to 24 hours she may carry 4 or 5 feet.

Entering the river, we find a depth from 12 to 15 feet water; but the channel is very crooked, owing to large rocks scattered in the channel, and reaching, in some cases, above the surface of low-water, but in others hidden a little below it. At 3 miles above the mouth we come to what I term "Island No. 1." The river up to this point has a width from 150 to 200 feet, but it now contracts to 100 feet or less. Four miles above the mouth we reach the foot of "Island No. 2." This island is about 3 miles long, and divides the river into two narrow channels running over a ledge of rocks—said to be limestone—which I am told underlies the entire bed of the river throughout the length of the island. At low-water I am informed that the depth in either channel will average about 2 inches.

It would require an excavation of about 34,000 cubic yards of rock to open a channel 30 feet wide by 2 feet deep, at a minimum cost of $2.50 per cubic yard; and when completed there would be a want of water to fill it. This, I think, settles the question of navigation.

This ledge of rock seems to act as a sort of dam, for above it the river expands into a pool called Dead River, which extends to the head of the hammock lands, 12 miles above the mouth. Lumber is the sole product of this region for market. For about 3 miles above the mouth there is an abundance of palmetto; also cedar, and a good deal of live oak. The cedar is said to be of poor quality, being gnarled, and wind-shaken by the coast storms. But above this the cedar is of fine quality, extending up to the head of Dead River. No lumber has been brought to market from any point above this. The lumbermen let their logs drift singly down the river, and collect them at some point below the islands. If anything should be done for this little stream, I would recommend that the drifting plan be continued, and that only such trees and snags be removed as may interfere with the drifting of single logs at medium stage of water. On this plan I think that $500 will pay for all work necessary between the mouth and the head of Dead River, 12 miles above. The only interest I know of to be benefited by the modest appropriation I have suggested is that of stripping the public lands of their timber.

* * * * * * *

I am, major, very respectfully, your obedient servant,

POWHATAN ROBINSON,
Assistant Engineer.

Maj. A. N. DAMRELL,
Captain, Corps of Engineers, U. S. A.

EXAMINATION OF EAST BAY AND BLACKWATER RIVER, FLORIDA.

UNITED STATES ENGINEER OFFICE,
Mobile, Ala., August 27, 1881.

GENERAL: I have the honor of submitting the following report upon the examination of East Bay and Blackwater River, Florida, authorized

by act of Congress approved June 14, 1880, and assigned to me by letter dated June 17, 1880.

The examination was carried from White's Point, 9 miles east of Pensacola, to a point on the river, about 12 miles above Milton.

The principal obstructions to the navigation of the bay are a number of hard shoals or lumps in the lower part, with from 2 to 5 feet water on them, and several sand ridges in the upper part, between Escribana and Robertson's Point, with 6 feet at low-water.

The only obstruction found in the river is what is known as Hunt's Bar, a compact sand bar, about 250 feet wide, with six feet of water, extending across the river one-half mile below Bagdad.

The improvement required is:

1st. The reduction of one of the lumps known as the "Beer Garden."

2d. The dredging of a channel through the sand ridges, 100 feet wide, to a depth of 9 feet at mean low-water (about 3 feet of dredging) and 2,500 feet long.

3d. The cutting of a channel of like width and depth through Hunt's Bar.

4th. Three beacons, one to be lighted.

The estimated cost of these improvements, not including the beacons, which come under the Light-House Establishment, is as follows:

Dredging, lump A, 5,000 cubic yards, at 50 cents	$2,500
Dredging on flats, 28,000 cubic yards, at 50 cents	14,000
Dredging on Hunt's Bar, 3,000 cubic yards, at 50 cents	1,500
	18,000
Engineering and contingencies	2,000
	20,000

The approximate estimate of the amount of commerce passing yearly through East Bay is:

EXPORTS.

	Value.
Lumber, 30,000,000 feet, B. M	$360,000
Sawed timber, 900,000 cubic feet	108,000
Hewed timber, 400,000 cubic feet	48,000
Sash, doors, and blinds	40,000
Wool, hides, shingles, and country produce	100,000
	656,000

IMPORTS.

	Value.
Provisions, machinery, and general merchandise	$600,000
Logs from Escambia	50,000
	650,000
Exports	656,000
Total value exports and imports	1,306,000

The following vessels make regular passages to Milton or Bagdad:

	Value.
Neptune, 600 annual passages	$25,000
Captain Sam, 200 annual passages	25,000
Juno, 150 annual passages	25,000
E. E. Simpson, 100 annual passages	25,000
Colonel R. Ingalls, 200 annual passages	6,000
Toiler, 200 annual passages	4,000
Steamers Mary Louisa, Seminole, Starlight, Santa Rosa, Mary Ida, and Hercules, plying chiefly in the lower bay, 150 passages each	60,000
Steamer Fountain, plying between Mobile and Milton, 150 passages	15,000

	Value.
Schooners Ajax, Martha, L. A. Ewards, Mary A. Rushing, W. A. Watson, Mary Ellen, Sarah Hale, 150 passages	$50,000
Vessels for repairs at the docks at Bagdad, varying from steamers of 600 to 700 tons, and sailing vessels from 50 to 300 tons, and in value from $3,000 to $50,000, averaging 100 annually, with a mean value of $10,000; two lumber lighters, $15,000	1,015,000
Total value of vessels	1,250,000
Exports and imports	1,306,000
	2,556,000

The town of Milton has a population, including the suburbs, of about 2,500. The population of Bagdad, including those dependent upon the mills of that place for maintenance, reaches about 1,500. These two communities have been built up and are supported mainly by the timber and lumber business.

Pensacola is the port of entry for East Bay and Blackwater River.

The report of Mr. H. Haines, who made the examination, and tracing of map illustrative of the same, is herewith forwarded.

Very respectfully, your obedient servant,

A. N. DAMRELL,
Captain of Engineers.

Brig. Gen. H. G WRIGHT,
Chief of Engineers, U. S. A.

REPORT OF MR. HIRAM HAINES, ASSISTANT ENGINEER.

MILTON, FLA., *November* 30, 1880.

SIR: In compliance with your orders, I have made an examination of East Bay and Blackwater River, Florida, my examination extending from White's Point, 9 miles east of Pensacola, to a point on the river about 12 miles above Milton.

In order to make the examination complete, I found it advisable to trace the shore lines of the bay and river from the points reached by the coast-survey chart to Milton, which is virtually the head of navigation, and take soundings on diagonals across the channel throughout that distance. The accompanying field map, and reduced copy of the same, which I have prepared during the progress of the examination, indicate the shore lines and marginal topography, the locality and contour of such shoals as it is important to mark, and their relation to the present and proposed lines for the courses of vessels navigating the bay.

The principal obstructions to the navigation of the bay and river consist in hard shoals or lumps dispersed in and along the channel of the lower part of the bay, and a number of narrow sand ridges lying interlaced across the channel of the mud flats between Escribana and Robertson's Points. There are from 2 to 5 feet of water upon the lumps, and 6 feet at extreme low-water upon the ridges. The only obstruction requiring removal in Blackwater River appears to be what is known as Hunt's Bar. This shoal extends obliquely across the channel of the river, about one-half a mile below Bagdad. It consists of compact sand, forming a ridge about 250 feet wide, with 6 feet of water upon it at low tide. The subjoined estimate of the cost of work required to remove these obstructions shows that a small amount, comparatively to the extent of the commerce to be benefited, will be necessary.

The reduction of lump marked A, locally known as the "Beer Garden", will relieve the lower bay of its chief obstruction. At present it is not only seriously in the way, but in endeavoring to avoid it others no less dangerous are liable to be encountered. By removing an average of about 2 feet of the summit of this lump for an area of 200 by 300 feet, the entire lower part of the bay may be traversed, as shown upon the map, by a direct line from the anchorage south of White's Point to the point northwest of Escribana Point, marked as a position for a beacon light.

The work estimated for across the "Flats" consists in dredging a channel-way 100 feet wide and 3 feet deep through the ridges referred to an aggregate length of 2,500 feet. The work on Hunt's Bar would be the cutting of a channel of like width and depth across it. The construction of any dams across the outlets from the river above this bar, for the purpose of directing the water to the channel, may, I think, be safely deferred, though some such work may ultimately be found advisable.

ESTIMATE FOR COST OF DREDGING.

Lump A, 5,000 cubic yards, at 25 cents	$1,250
On Flats, 28,000 cubic yards, at 25 cents	7,000
Hunt's Bar, 3,000 cubic yards, at 25 cents	750
	9,000
Engineering and contingencies	1,000
	10,000

* * * * * * *

The following is a statement of the amount of timber and lumber exported from Pensacola during the commercial year ending August 31, 1880:

Countries.	Hewed timber.	Sawed timber.	Lumber.
	Cubic feet.	*Cubic feet.*	*B. M. feet.*
Great Britain	3,176,651	5,389,745	17,551,000
Continent of Europe	565,306	590,568	15,898,000
Africa, Java, and Azores	3,060	179,056	504,000
West Indies and South America	1,848	.....	13,982,000
Coastwise	.....	.....	38,599,000
	3,747,765	6,159,369	86,534,000

It is estimated by those most conversant with the subject that at least three-fourths of this commerce is brought down the Escambia and Blackwater rivers.

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Very respectfully, your obedient servant,

HIRAM HAINES,
Assistant Engineer.

Maj. A. N. DAMRELL,
Captain of Engineers, U. S. A.

EXAMINATION OF OCOLOCKONNEE RIVER, FLORIDA.

UNITED STATES ENGINEER OFFICE,
Mobile, Ala., August 26, 1881.

GENERAL: I have the honor of submitting the following report upon the examination of the Ocolockonnee River, Florida, authorized by act of Congress approved June 14, 1880, and assigned to me by letter dated June 17, 1880. The examination was carried 60 miles up the river.

There was found water sufficient for a vessel with a draught of about 8 feet across the bar at the mouth of Ocolockonnee Bay, and thence through the bay into the river. From the mouth of the river (48 miles up) to Smith's Creek there is water enough for a vessel with about 4 feet draught, and from there only for 2 feet, or possibly 2½ feet, at low-water.

The obstructions to navigation are logs, snags, and overhanging trees. The cost of improvement is estimated at about $20,000 for the 60 miles.

The present commerce on the river appears to be confined to rafting logs, and is small in extent, but no approximation as to the exact amount could be obtained.

The country on this portion of the river is very poor, but the counties bordering the upper portion, above where the examination was carried —Leon and Gadsden—are rich and productive.

The report of Mr. Powhatan Robinson, who made the examination, is forwarded herewith.

Very respectfully, your obedient servant,

A. N. DAMRELL,
Captain of Engineers.

Brig. Gen. H. G. WRIGHT,
Chief of Engineers, U. S. A.

REPORT OF MR. POWHATAN ROBINSON, ASSISTANT ENGINEER.

MOBILE, *January* 18, 1881.

MAJOR: In pursuance of your orders of October 22, 1880, I have made an examination of the Ocolockonnee River, with a view toward its improvement, and I now have the honor to submit the result of my observations.

* * * * * * *

A vessel can carry about 8 feet draught across the bar at the mouth of Ocolockonnee Bay, thence up the bay, by an intricate channel, to the mouth of the river, and thence, I think, for 30 miles up the river, to a place which I shall call Old River Lake. Up to this point the river is from 160 feet to 500 feet wide, more and less, perhaps. I roughly estimate the cost of improvement for navigation up to this point at $1,000. But here the river changes its character entirely. It is reduced in width to, from 60 feet to 120 feet, more and less. It seems to have torn its way through swamps. * * * The channel is filled with logs, trees, and snags, and much obstructed by overhanging trees. To put it in navigable order above Old River Lake, will cost, I should say for 20 miles, at $250 per mile, $5,000. This is for the removal of snags, logs, and trees. Above this the cost would not exceed, I think, $150 per mile. The country is poor beyond expression—a mere bed of sand. The inhabitants tell me they barely make a living from year to year. * * * I had to depend mainly on my own observations for information concerning the river. The people know nothing about it; I do not think they use it at all, except for rafting, and I believe that the general mode of rafting is to turn a little raft loose somewhere, and then cut across the country and meet it somewhere below. The river is more persistently crooked than any stream that I have ever met with. I mean that it is everlastingly crooked one way or the other, and a reach of 1 mile is a rare sight. The local formula for computing distances by water is "3 miles in for 1 mile out." This is the reason that they always travel by land.

At 8 miles above the mouth, I passed the last house in sight of the river. After this I saw no human being on my entire trip of 60 miles, with the exception of a sporadic party of negroes, who passed me 20 miles above the mouth, in 2 boats loaded with potatoes, greens, &c. * * *

An occasional bluff finds its way to the water's edge, and intermediately the river at high-water spreads out over extensive swamps interspersed with lakes and lagoons. I should have mentioned that I think a boat might carry 4 feet draught up to Smith Creek, 48 miles above the mouth. Beyond this I do not think we could depend upon a depth of more than from 2 feet to 2½ feet at low-water.

Leon and Gadsden counties, bordering on the State of Georgia, and separated from each other by the river, are both rich. The Jacksonville, Pensacola and Mobile Railroad passes through them, east and west, and there is also a railroad from Tallahassee to Saint Mark's, connecting at the latter place with the Gulf. These communities are thus furnished with direct and rapid communication with their markets, affording them facilities very much superior to anything that the navigation of the Ocolockonne River could offer.

There is an abundance of good timber on the river. An appropriation of $3,000 would be sufficient, in my judgment, to clear it out for rafting purposes alone from Old River Lake to McCall's Bridge, a distance of about 80 miles. McCall's Bridge is on the old public road between Tallahassee, Quincy, and so on. It is 15 miles by land below the railroad.

I am, major, with great respect, your obedient servant,

POWHATAN ROBINSON,
Assistant Engineer.

Maj. A. N. DAMRELL,
Captain, Corps of Engineers, U. S. A.

EXAMINATION OF AUCILLA AND WACISSA RIVERS, FLORIDA.

UNITED STATES ENGINEER OFFICE,
Mobile, Ala., August 26, 1881.

GENERAL: I have the honor of submitting the following report upon the examination of the Aucilla and Wacissa rivers, Florida, provided for by act of Congress approved June 14, 1880, and assigned to me by letter dated June 17, 1880.

The Aucilla was found to have a bar, composed of mud and oyster

beds, at its mouth, extending about 3 miles seaward, and with sufficient depth to permit vessels of 2½ feet draught to cross at low-water, and about 5 feet at high-water.

Six miles above the mouth commences a series of natural bridges, 12 in number, varying in width from 20 feet to half a mile, separated from each other by open portions of the river from 450 feet to three-fourths of a mile long, which covers nearly 12 miles of the river with a complete obstruction to navigation. The thickness of these bridges and the depth of water beneath were not ascertained, time and stage of water not permitting, but it is believed from information obtained from observation of parties living in the vicinity that the depth under the bridge is sufficient to allow of the material being dropped down by blasting. The aggregate transverse length of the bridge is about 1⅙ miles.

The valley of the river is very productive, and Jefferson County, of which it forms the east boundary, is one of the richest and most productive in the State. Madison County, on the east side, is also a rich county. The products are cotton (sea-island and short staple), sugar, molasses, corn, rice, &c. Timber is also abundant and of the best quality.

The river not being now navigated to a sufficient distance up, there is no commerce of any importance, or none that could be ascertained.

The examination would seem to indicate the river and adjacent country are such as to merit a careful survey.

The Wacissa is a very short stream, about 10 miles long, with an abundance of water, which empties into the Aucilla 5 miles above its mouth, and requires the removal of some logs which now obstruct its channel, at an estimated cost of about $300, provided it is undertaken at the same time as the improvement of the Aucilla, so that the same outfit could be used for both.

Very respectfully, your obedient servant,

A. N. DAMRELL,
Captain of Engineers.

Brig. Gen. H. G. WRIGHT,
Chief of Engineers, U. S. A.

REPORT OF MR. POWHATAN ROBINSON, ASSISTANT ENGINEER.

MOBILE, ALA., *January* 17, 1881.

MAJOR: In pursuance of your orders of October 22, 1880, I have made an examination of the Aucilla and Wacissa rivers, in Northwestern Florida, with a view toward their improvement, and I now have the honor to submit the results of my observations.

The approach to this river is obstructed by mud banks and oyster beds for about 3 miles seaward. A vessel may carry a 2½ feet draught over the bar at low-water, and 5 feet or more at high-water. But all navigation is effectually barred by a notable formation, commencing 6 miles above the mouth of the river and extending upward into the 12th mile. This consists of a series of rock or shale ribs extending entirely across the river, and designated as "natural bridges" by the neighboring citizens.

There are 12 of these, and I give their dimensions and positions as stated to me by persons who live on the spot.

Bridge No. 1, ½ mile wide; then open river three-fourths mile.
Bridge No. 2, 900 feet wide; then open river 2 miles.
Bridge No. 3, 75 feet wide; then open river 1,200 feet.
Bridge No. 4, 20 feet wide; then open river 450 feet.
Bridge No. 5, 35 feet wide; then open river one-fourth mile.
Bridge No. 6, 50 feet wide; then open river one-fourth mile.
Bridge No. 7, 450 feet wide; then open river one-fourth mile.
Bridge No. 8, 300 feet wide; then open river 500 feet.
Bridge No. 9, 300 feet wide; then open river 500 feet.

Bridge No. 10, 300 feet wide; then open river one-fourth mile.
Bridge No. 11, 450 feet wide; then open river one-fourth mile.
Bridge No. 12, 600 feet wide; last bridge.

Some of these bridges are cultivated and produce abundantly, although at the time of full fresh the water runs 3 feet deep over the highest of them. The low-water level corresponds very nearly, I think, with the soffits (if I may so call them) of the bridges.

* * * * * * *

Inquiring about the thickness of the bridges and the depth of the stream beneath them, with a view toward the disposition of the material when removed, I was told that the bridges where they had seen portions break off were about 6 feet thick, and that the depth of water beneath was from 25 feet to 30 feet. This was inferred from the depth to which the pine trees were submerged, when they fell in perpendicularly, to wit, up to their limbs. I accept the depth of water, but I think the average thickness of the bridges will probably exceed 6 feet. I believe that they can be all removed at a cost of $5,000.

It will be seen from the table that the aggregate transverse length of the bridges is $1\frac{1}{6}$ miles, or more than 6,000 feet. I think that 3,000 feet of drilled holes, about 2 inches in diameter, and from $2\frac{1}{2}$ feet to 4 feet deep, properly aligned, and well loaded above with sand or rubbish to insure the blowing down of the soffits, will cause the bridges to drop into the water beneath and dispose of them satisfactorily. My informants said they thought that the material of the bridges was limestone, but I suspect it is shale.

The basin of the Aucilla must be included among the "garden spots" of Florida. The river is the eastern boundary of Jefferson County, extending from the Gulf to the Georgia State line, and second only to Leon County in past times in wealth and productiveness. Of its present relations to other counties I cannot speak advisedly. In 1850, according to Lippincott's Gazetteer, edition of 1873, it was second only to Leon County. By the census of 1870 it was still second only to Leon County. The census of 1870 is the only source of specific information to which I could refer. * * * Madison County, on the east side, and next to Georgia, is rich. Taylor County is poor. The agricultural products of the bordering counties are cotton, both sea-island and short staple, sugar, molasses, corn, rice, &c. The "hammock lands" set in about $1\frac{1}{2}$ miles above the mouth of the river and extend $10\frac{1}{2}$ miles up, *i.e.*, 12 miles above the mouth. They are at present abundantly covered with timber of the best quality—live oak, palmetto, ash, white oak, beech, cherry, mulberry, cypress, and so on. These lands belong mostly, if not entirely, to the government. They are fertile. It is said they would be worth $50 per acre when cleared of their timber. * * * It is thought that if the bridges I have described were removed these lands would be brought into the market at once. It is self-evident that these obstructions totally submerged at high-water must raise the high-water level very considerably, to the great detriment of the public lands.

The time selected for my examination was unfortunate, as a general and heavy fresh pervaded all the rivers in this region. I could not ascend the river, but I am told that by cleaning out the logs and trees, a boat carrying from 2 feet to $2\frac{1}{2}$ feet draught will be able to ascend it up to the railroad. To take merely a business view of the matter, I am convinced that the removal of the bridges would be advantageous.

THE WACISSA.

This is a lake in the midst of a swamp. It formerly vented itself through the swamp by various outlets into the Aucilla. One of these was improved; that is to say, it was opened to a width of 30 feet and a depth of 3 feet. This canal, so called, is about 3 miles long, and its mouth is about 5 miles above the mouth of the Aucilla. The lake is about 10 miles long, and heads, at its northwestern extremity, against the bluffs of the rich and cultivated lands, where it is fed by numerous springs. It has an abundant depth of water; is 280 feet wide at its narrowest point, and never rises more than 2 feet above low-water. The canal is now obstructed by logs. It will require about $300 to remove them.

I am, major, with great respect, your obedient servant,

POWHATAN ROBINSON,
Assistant Engineer.

Maj. A. N. DAMRELL,
Captain, Corps of Engineers, U. S. A.

47TH CONGRESS, 1st Session. } SENATE. { EX. DOC. No. 12.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING

A communication from the Chief of Engineers, dated the 13th instant, and accompanying copy of report from Maj. Henry M. Robert, Corps of Engineers, upon an examination of the mouth of Cedar River, &c.

DECEMBER 15, 1881.—Referred to the Committee on Commerce and ordered to be printed.

WAR DEPARTMENT,
Washington City, December 14, 1881.

The Secretary of War has the honor to transmit to the United States Senate, for the information of the Committee on Commerce, a communication from the Chief of Engineers, dated the 13th instant, and accompanying copy of report from Maj. Henry M. Robert, Corps of Engineers, upon an examination of the "mouth of Cedar River" and of the "harbor at the mouth of Cedar River, on Green Bay, Michigan," made in compliance with the provisions of the river and harbor act of March 3, 1881.

ROBERT T. LINCOLN,
Secretary of War.

The PRESIDENT *pro tempore*
of the United States Senate.

OFFICE OF THE CHIEF OF ENGINEERS,
UNITED STATES ARMY,
Washington, D. C., December 13, 1881.

SIR: I have the honor to submit a copy of a report to this office from Maj. Henry M. Robert, Corps of Engineers, of the results of an examination of the "mouth of Cedar River" and of the "harbor at the mouth of Cedar River, on Green Bay, Michigan," made under his direction to comply with provisions of the river and harbor act of March 3, 1881.

Very respectfully, your obedient servant,

H. G. WRIGHT,
Chief of Engineers, Brig. and Bvt. Maj. Gen.

Hon. ROBERT T. LINCOLN,
Secretary of War.

EXAMINATION OF MOUTH OF CEDAR RIVER AND HARBOR AT MOUTH OF CEDAR RIVER, ON GREEN BAY, MICHIGAN.

UNITED STATES ENGINEER OFFICE,
Milwaukee, Wis., November 30, 1881.

SIR: I have the honor to submit the following report on an examination of the "mouth of Cedar River" and "harbor at mouth of Cedar River, on Green Bay, Michigan," called for by the river and harbor act approved March 3, 1881.

As funds were allotted only sufficient for an examination, it has been with difficulty that enough information has been obtained to enable Congress to decide upon the advisability of constructing a harbor at this point. Assistant Engineer L. Y. Schermerhorn, in July, made a personal examination in company with Jesse Spalding, esq., the owner of the saw-mill at this point.

This examination showed the necessity for a careful survey with borings. In September as full a survey was made, by Mr. L. M. Mann, as the funds would allow, Mr. Spalding aiding by allowing a free use of his tug. Enough information was obtained to allow an estimate of the cost of the improvement to be made with a fair degree of accuracy. The exact direction that should be given to the outer portion of the piers can only be determined after a careful examination of the shoal outside the piers. This, however, does not materially affect the cost or the advisability of the improvement. If Congress decides to undertake the work and makes an appropriation for it, this question could be decided during the progress of the work.

The survey extended from the shore to the 20-foot curve for a distance of about 1,800 feet along the shore, and also up the river to the steamboat dock, a distance of 1,300 feet from the outer end of the present piers. Thirty-seven borings were made within the limits of the survey, nineteen of them being on what would have to be the site of any improvement that was made, and the others on either side. The attempt was made in all cases to reach a depth of 20 feet below the present water surface, or 19 feet below mean low-water, and it was successful in twenty out of the thirty-seven borings. Of the seventeen borings that failed to reach the required depths, ten of them varied from 7 to 14 feet in depth; three of them failed to reach a greater depth than 7 feet at mean low-water. At the mouth of the river, where will have to be located any improvement that is ever made at this point, two-thirds of the eighteen borings reached the depth of 19 feet below mean low-water, while the remaining six borings on this site reached the depths, respectively, of 18 feet, 17 feet, two 14 feet, 12 feet, and 7 feet. In all cases the descent of the pipe was stopped by bowlders, and in one case at least fifteen separate attempts were made by slightly changing the position of the pipe, before abandoning the effort to reach the depth of 20 feet from present water surface. In no case was there any evidence of the existence of bed rock.

The survey developed the existence of a shoal with only 11 feet of water on it at mean low-water, about 600 feet beyond what would probably be the heads of the piers if extended to the 16-foot curve. This was unknown at the time of the survey, and no borings were made on it. Judging from the surroundings there is no probability of rock on this shoal, except in the shape of bowlders. As the distance from the 15-foot curve on this shoal to the same curve on the long shoal, extending from the shore on the west side of the mouth of the river, is only about 400 feet, and as vessels would have to enter the piers between

these shoals, and as the saw-mill at this point furnishes all the material for export, and the vessels in such trade draw 13 feet—on these accounts I think it will be better to dredge off this shoal to a depth of 15 feet, and thus widen the entrance. Its entire cost, including the removal of bowlders outside the entrance to the channel, will probably be less than $5,000.

Cedar River, as stated in Assistant Engineer Schermerhorns report, is a hamlet containing about 200 people, a saw-mill, a hotel, stores, boarding-houses, and a dozen dwelling-houses. While at present there is no means of communicating with the interior, except by trails, Mr. Jesse Spalding, the owner of the mill, says that he expects soon to have a railroad built from the mouth of Cedar River to Kloman on the Chicago and Northwestern Railroad, thus connecting the place with the Menomonee iron district. At present the iron ore from this district is shipped down the Menomonee River Railroad to the junction with the Chicago and Northwestern Railroad, and thence by the latter road to Escanaba. The distance by rail from the junction to Escanaba is 23 miles, while Kloman is only 3 miles from the junction and 18½ miles in an air line from the mouth of Cedar River. If the new railroad is built perfectly straight, Cedar River will be only 21½ miles from the Menomonee River Junction, while Escanaba is 23 miles.

To counterbalance this disadvantage in distance, Escanaba has the advantage of several large, costly ore docks, costing many hundreds of thousands of dollars.

In estimating the cost of improving this harbor, I have assumed that all improvements inside of the outer end of the present slab piers or docks, whether for ore docks or saw-mill, or anything else, are to be made by the parties interested, and that the United States simply undertakes to do the work outside of the shore line. I take the outer end of the present slab piers as the shore line, as these piers are practically the docks to the lumber yards, and are private property. Leaving, then, everything inside of the outer ends of these slab docks to private enterprise, there would remain, in order to allow lumber vessels drawing 13 feet to leave the river, the construction of two parallel piers 200 feet apart, with an aggregate length of about 2,400 feet, the channel between the piers to be dredged to a depth of 14 feet. The shoal previously referred to should be removed. One thousand feet of the piers, including all beyond the 10-foot curve at mean low-water, should consist of cribs, and the balance should be pile pier built of round piles, within side lining of sheet piling, as at Kewaunee, Wis. I would estimate cost as follows:

1,430 linear feet of pile pier, at $30	$42,900 00
1,000 linear feet of crib pier 20 feet wide, at $63	63,000 00
50,000 cubic yards dredging between piers, at 30 cents	15,000 00
15,000 cubic yards dredging on shoal, bowlders, &c., beyond piers, at 30 cents	4,500 00
Contingencies, superintendence, &c	12,600 00
Total	138,000 00

With this report I send the following documents, which contain all the facts bearing on the case that I have been able to collect:

Assistant Engineer L. Y. Schermerhorn's report; Mr. Jesse Spalding's letter, written at my request that he would furnish me all the information bearing on the subject in his possession; report of commercial statistics; and the map of the survey, which also contains a reduced railroad map, furnished by Mr. Jesse Spalding, showing the location of the

proposed railroad from mouth of Cedar River to Kloman on the Chicago and Northwestern Railroad.

Very respectfully, your obedient servant,

HENRY M. ROBERT,
Major of Engineers.

The CHIEF OF ENGINEERS, *U. S. A.*

REPORT OF MR. L. Y. SCHERMERHORN, ASSISTANT ENGINEER.

MILWAUKEE, WIS., *October* 8, 1881.

SIR: I have the honor to submit the following report on the examination of the mouth of Cedar River and harbor at mouth of Cedar River, on Green Bay, Michigan:

In July I made a personal examination of the mouth of Cedar River and its vicinity, and in September Mr. L. M. Mann and party made a preliminary survey, with sufficient borings and soundings to determine the character of the lake bed and the general position of the curves of depth. The information furnished by this examination is sufficient to form the basis of a plan and estimate, but more extended borings and soundings will be required before the proper position of the piers can be determined. The examination was made with as much detail as the funds would permit.

The mouth and harbor of Cedar River are situated on the west shore of Green Bay, in Menomonee County, Michigan, about 70 miles northerly from Green Bay Harbor, 25 miles northerly from Menomonee Harbor, and 28 miles southerly from Escanaba, Mich.

At the mouth of Cedar River is the hamlet of Cedar Forks, with a population of about 200, and containing a steam saw-mill, boarding-houses, hotel, store, and about a dozen dwelling-houses.

The agricultural industries of the vicinity are almost entirely undeveloped, and nearly all the business is centered in the steam saw-mill and the products of the forest. The improvements and developments at the mouth of the river have been made and are controlled by the saw-mill interest.

Cedar River rises in the northerly part of Menomonee County, Michigan, at a point about 35 miles from its mouth, and drains a watershed of about 350 square miles. The normal discharge of the river is small, and its depth barely sufficient for floating saw-logs from its upper reaches to the mill at its mouth.

The United States Lake Survey of 1863 shows the mouth of the river but slightly changed from its natural condition, with a width of about 175 feet, and a low-water depth, immediately at the mouth, of from 8 to 10 feet, and on the bar in front of the mouth, a depth of about 3 feet.

The lands along the river furnish a good quality of pine, and about 20,000,000 feet (board measure) was cut by the mill at Cedar Forks in 1880; this quantity probably represents the annual product for several years to come, and also represents the principal business resources of the harbor.

The nearest outlet, apart from water communication, is the Chicago and Northwestern Railroad, which, at the nearest point, is about 12 miles distant from the mouth of Cedar River. Passable roads have not yet been opened between the railroad and the settlement at the river mouth. Two small steamers connecting with Green Bay ports touch twice a week at the mouth of Cedar River; the aggregate of their business is small. The lumber manufactured by the steam mill is loaded on scows in the river, and moved out to vessels lying at anchor in the deep water off the river mouth.

The saw-mill interests have partially improved the river and its entrance by extending piers about 1,000 feet beyond the natural mouth of the river, docking the river banks, and dredging a channel about 8 feet deep and 50 feet wide, connecting the deep water in the bay with the docks in the river. The piers and docking are built of slabs and mill refuse, aided by occasional piles to secure the material in place. As the slab piers have been extended, the shore line in their vicinity has been advanced by the deposition of mill refuse, and has now reached a position about 1,000 feet in advance of its position as determined by the Lake Survey of 1863.

The examination of 1881 showed that the lake bed is composed of coarse gravel and bowlders, either associated with, or superimposed on, clay; over quite limited areas the gravel and bowlder clay deposit is covered with sand to a depth of a few feet; no rock in place was discovered by any of the borings, which were generally carried to a depth of about 20 feet below the water surface. Large bowlders can be seen covering the bottom in many places in the vicinity of the river mouth, and it is highly probable that the gravel and bowlder clay deposit is of considerable extent. The curves of depth are not generally parallel to the shore line, but follow very sinuous lines, which

further indicate that the lake bed cannot be largely composed of sand or other material easily moved by the action of waves.

The examination covered an area limited by the 20-foot curve, and in front of about 1,800 linear feet of shore line; within this area the 20-foot curve is distant from the shore line from 2,400 to 4,000 feet; the intermediate curves of depth are proportionally irregular in position. Directly in front of the present entrance and on the line of extension of the present slab piers, the curves of depth have the following distances from the ends of the present piers:

6-foot curve, 300 feet.
9-foot curve, 650 feet.
12-foot curve, 800 feet.
15-foot curve, 1,000 feet.
18-foot curve, 3,400 feet.

After reaching the 15-foot curve, by turning to the left, the 18-foot curve can be reached at a distance of about 2,200 feet from the present end of the piers. On this divergent line, and between the 15 and 18 foot curve, about 1,800 feet from the end of the piers, a shoal occurs with a depth less than 14 feet; this shoal is about 400 feet in length and 200 feet in width; the borings did not reach this shoal, and consequently exact information as to its constitution is not at hand; but by inference it probably consists of bowlders and clay; more detailed examination should be hereafter made for the determination of its character.

[NOTE.—All statements of height or depth in this report are referred to datum, which is the assumed plane of low-water, *i. e.*, a plane 4 feet below the plane of reference of the Lake Survey (high-water of 1838). The datum plane is 0.5 foot above the mean level of Lake Michigan for the months of June, July, and August, 1847, and 1.0 foot below the mean lake level from January, 1860, to January, 1881, and is also 1.2 feet below the mean lake level for the ordinary seasons of navigation (April to November, inclusive), from 1860 to 1880, inclusive.]

The character of the improvement of a harbor must be controlled and determined by the special or general requirements of commerce; the special requirements will depend upon the existing or assumed commerce of the harbor; the general requirements upon the necessity of a harbor of refuge to the general commerce of the vicinity. Since there seems to be no occasion for the latter, it may be omitted, and consideration only given to the local commerce of the harbor. In connection with this question it may be relevant to state that Jesse Spalding, esq., who is largely interested in the lumber interests of Cedar River, anticipates the construction of a railroad from "section No. 42" on the Chicago and Northwestern Railroad to the mouth of Cedar River; the object of such a road being to connect the large and valuable iron mines of the Menomonee district with a new port of shipment at the mouth of Cedar River. Mr. Spalding will probably make this the subject of a special communication to you.

From what has been previously said in relation to the commercial requirements of Cedar River it is evident that any plan of improvement should be based upon the requirements connected with the shipment of lumber. The vessels engaged in this trade are generally lumber barges or sailing vessels of large capacity, the loaded draught of which is from 10 to 13 feet. To provide for their accommodation an available depth of 14 feet should be obtained; to maintain this depth the piers should be extended to at least the 16-foot curve, and the channel between the piers dredged to a depth of 14 feet below datum.

The plan upon which the following estimate is based proposes the extension, from the ends of the present slab piers, of two parallel piers, 200 feet apart and extending to the 16-foot curve. Between the ends of the present slab piers and to the 12-foot curve, the extension to consist of pile piers filled with stone and rendered sand-tight by the use of sheet piling. From the 12-foot to the 16-foot curve the ordinary crib piers would be used.

The pile pier to consist of two parallel rows of piles, 14 feet apart; those upon the channel side of the pier to be closely driven, and upon the other side placed 4 feet apart between centers, each line of piles to be brought into alignment and secured by wales and screw-bolts. At intervals of 10 feet, iron tie rods $1\frac{1}{2}$ inches in diameter pass, at the water surface, from one line of piles to the other, to prevent them from spreading when subjected to the thrust of the stone filling. On the inner side of the outer row of piles is placed a double row of sheet piling, consisting of two thicknesses of 3-inch plank, secured by wales and screw bolts to the adjacent piles; the object of the sheet piles is to render the pier impervious to the passage of sand; this plan has been successfully tried at Kewaunee Harbor, Wisconsin, and is believed to remove the objection which has hitherto existed in the ordinary pile pier. The piles to be cut off 6 feet above datum and the work filled with stone; the length of the pile piers will be about 1,600 linear feet. The crib piers to consist of timber cribs 20 feet in width, surmounted by superstructure carried 6 feet above datum, the whole filled with stone; the length of the crib piers will be about 800 linear feet.

The existing slab piers and docking would probably require some additional piles

driven along the channel side so as to permit the dredging along the docks to be carried to the necessary depth; since the docking would be used by private parties for the storage and shipment of lumber, it seems proper that any additional work necessary to place them in proper condition should be done at the expense of the users, consequently the cost of such additional work has been omitted from this estimate.

The estimate for dredging provides for a channel 150 feet wide, with an available depth of 14 feet below datum.

The estimated quantities are divided into two sections, as follows:

1st. From the 14-foot curve to the end of the present slab piers, requiring the excavation of 60,000 cubic yards, scow measurement.

2d. From the end of the present slab piers, and for a distance of about 1,400 feet, or to the steamboat dock in the river, requiring the excavation of 90,000 cubic yards, scow measurement. In the calculation for the quantities of dredging, the excavation has been taken to the depth of 15 feet below datum, thereby allowing 1 foot for back filling and irregularities in dredging; 25 per cent. has been added to place measurement to reduce the quantities to scow measurement.

Upon the foregoing plan the following estimate is submitted:

1,600 linear feet of pile pier, at $30	$48,000 00
800 linear feet of crib pier, at $63	50,400 00
60,000 cubic yards dredging between 14-foot curve and end of present slab piers, at 30 cents	18,000 00
Add 10 per cent	11,640 00
	128,040 00
Or to carry channel to steamboat dock:	
1,600 linear feet of pile pier, at $30	48,000 00
800 linear feet crib pier, at $63	50,400 00
60,000 cubic yards dredging between 14-foot curve and end of present slab piers, at 30 cents	18,000 00
90,000 cubic yards dredging between end of present slab piers and steamboat dock, at 25 cents	22,500 00
Add 10 per cent	13,890 00
	152,790 00

Very respectfully, your obedient servant,

L. Y. SCHERMERHORN,
Assistant Engineer.

Maj. HENRY M. ROBERT,
Corps of Engineers, U. S. A.

LETTER FROM MR. JESSE SPALDING.

CHICAGO, ILL., *October* 13, 1881.

DEAR SIR: Thinking information would be desirable on the subject of a harbor at the mouth of Cedar River, I give you herewith such as I have at hand and in mind, bearing upon the subject,

First. There are 60 miles of coast between the harbor at Menomonee and the harbor at Escanaba. No harbor or shelter in time of storms on the north shore of Green Bay between these points.

Second. Cedar River is half way between Menomonee and Escanaba, and a harbor there to enable vessels to deliver and receive their cargoes inside, instead of receiving and delivering them on lighters outside, as they are obliged to do now, as well as a shelter in time of storms, would be a great benefit and protection to the commerce of Green Bay as well as Lake Michigan.

Third. It is 30 miles from the mouth of Cedar River to the heart of Menomonee iron range, which is proving quite equal to the Lake Superior iron range. Shipments from this range this year will be nearly equal to the shipments from the Lake Superior range.

A railroad has been surveyed and located and will be built from the mouth of Cedar River to the Menomonee iron range.

The distance by this projected road from the mouth of Cedar River to where it first strikes the Menomonee iron range is 18 miles; the distance to where it crosses the main line of the Chicago and Northwestern Railroad is 16 miles.

Fourth. The railroad mentioned, when completed, will shorten the distance and increase the development and facilities of shipping by water the products of this vast iron range.

Fifth. The lands about Cedar River, both north and south, are fertile, and are being rapidly cleared up and settled. The products of the farming interests cannot be

shipped without a harbor, except by lightering out to vessels, or using small light-draught vessels to run inside.

Sixth. The cost of building a harbor at this point is not large. The benefit, protection, and increased facilities to commerce and otherwise to be derived from the building of said harbor is, in my opinion, fully sufficient to justify the outlay.

Very truly yours,

JESSE SPALDING.

Maj. HENRY M. ROBERT,
Corps of Engineers, U. S. A.

COMMERCIAL STATISTICS.

Name of harbor, At mouth of Cedar River, Green Bay, Michigan.
Collection district, Superior, Mich.
Nearest light-house, Menomonee, Mich.

Arrival and departure of vessels during the year ending December 31, 1880.

	Arrivals.			Departures.		
	No.	Tonnage.	Crews.	No.	Tonnage.	Crews.
Steamers, including tugs*	380	38, 000	2, 880	380	38, 000	2, 880
Sailing-vessels*	185	50, 875	1, 295	185	50, 875	1, 295
	565	88, 875	4, 175	565	88, 875	4, 175

* Mr. John Murphy, in charge of the docks and warehouse at the mouth of Cedar River, reports the number of arrivals of steamers (including tugs) at 231, and of sailing vessels at 95.

Exports during the year ending December 31, 1880.

Bark	cords	1, 000	Poles	number	30, 000
Lath	number	4, 832, 000	Posts	number	250, 000
Lumber	feet, B. M.	32, 189, 000	Railroad ties	number	250, 000
Pickets	number	694, 000			

Imports during the year ending December 31, 1880.

Beef	barrels	750	Live stock (cattle)	number	300
Corn	bushels	5, 000	Oats	bushels	30, 000
Feed	tons	100	Pork	barrels	750
Flour	barrels	600	Sundries	tons	450

The above information was obtained from Jesse Spalding, esq.

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47TH CONGRESS, 1st Session. } SENATE. { EX. DOC. No. 13.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING

A communication from the Chief of Engineers, dated the 13th instant, covering copy of report from Maj. S. M. Mansfield, Corps of Engineers, upon a survey of Matagorda Bay, at the mouth of Saint Mary's Bayou, Texas.

DECEMBER 15, 1881.—Referred to the Committee on Commerce and ordered to be printed.

WAR DEPARTMENT,
Washington City, December 14, 1881.

The Secretary of War has the honor to transmit to the United States Senate, for the information of the Committee on Commerce, a communication from the Chief of Engineers, dated the 13th instant, covering copy of report from Maj. S. M. Mansfield, Corps of Engineers, upon a survey, made in accordance with provisions in the river and harbor act of March 3, 1881, of Matagorda Bay, at the mouth of Saint Mary's Bayou, Texas, near the town of Matagorda, Tex.

ROBERT T. LINCOLN,
Secretary of War.

The PRESIDENT *pro tempore*
of the United States Senate.

OFFICE OF THE CHIEF OF ENGINEERS,
UNITED STATES ARMY,
Washington, D. C., December 13, 1881.

SIR: I have the honor to submit herewith a copy of a report to this office from Maj. S. M. Mansfield, Corps of Engineers, of the results of a survey of Matagorda Bay, at the mouth of Saint Mary's Bayou, Texas, near the town of Matagorda, Tex., made under his direction to comply with requirements of the river and harbor act of March 3, 1881.

Very respectfully, your obedient servant,

H. G. WRIGHT,
Chief of Engineers, Brig. and Bvt. Maj. Gen.

Hon. ROBERT T. LINCOLN,
Secretary of War.

SURVEY OF MATAGORDA BAY, AT THE MOUTH OF SAINT MARY'S BAYOU, NEAR THE TOWN OF MATAGORDA, TEX.

UNITED STATES ENGINEER OFFICE,
Galveston, Tex., November 25, 1881.

GENERAL: I have the honor to transmit herewith a chart of Matagorda Bay at the mouth of Saint Mary's Bayou, near the town of Matagorda, Tex., together with the report of Assistant Engineer John M. Picton of his survey made under my direction in accordance with the act of Congress approved March 3, 1881.

MATAGORDA BAY.

At present there is a channel of 2 feet depth across the bar at mean low tide, but during the extreme low-water of winter caused by northers, the bar itself is visible above the water surface

Dredging would seem to be the best means of deepening the channel across the bar; being stiff mud, would probably remain open some time without revetment. Mr. Picton makes an estimate of $10,000 for dredging a channel 3 feet deep, 100 feet wide at bottom, and slope one on two.

Commercial statistics are wanting, but from statements supplied by some of the leading merchants it is learned that a business of about $175,000 is transacted in general merchandise; 474 bales of cotton, 50 sacks of wool, 9,000 hides, were the principal exports during 1880.

Very respectfully, your obedient servant,

S. M. MANSFIELD,
Major of Engineers, Brevet Lieut. Col., U. S. A.

The CHIEF OF ENGINEERS, U. S. A.

REPORT OF MR. JOHN M. PICTON, ASSISTANT ENGINEER.

GALVESTON, TEX., *September* 17, 1881.

COLONEL: I have the honor to submit the following report of the "survey of Matagorda Bay at the mouth of Saint Mary's Bayou, near the town of Matagorda, Tex."

* * * * * * *

The survey was made during a low stage of the Colorado River, and is as complete as the time would allow. Its purpose was to ascertain the depth of water across the bar and the best means of improvement.

* * * * * * *

A record of the tide was kept during the time of survey, and readings taken every hour during daylight. The bayou being so far from the tidal entrance of Matagorda Bay (40 miles), very little of the Gulf tide reaches it; consequently the daily range is very small and caused principally by wind. The series of observations for tide were not extended enough to accurately establish the plane of mean low-tide, only two minimums being observed. A reading of 3 feet on the gauge was assumed as the plane of reference. The highest tide observed was seven-tenths of a foot above, and the lowest tide two-tenths of a foot below this plane.

About 4 miles below the mouth of Saint Mary's Bayou, a reef principally of oyster shells and with three small channels through it, extends entirely across the bay, and greatly obstructs the admission of the flood-tide into the upper bay. The most northerly of the three channels crossing it is known as "Dog Island Channel," and was opened by citizens of Matagorda County, and has a least depth at ordinary tide of 3 feet. The most southerly of these channels crosses the reef near Matagorda peninsula, where it is much narrower and composed of sand. Any improvement contemplating a greater depth than 3 feet across the bar at the mouth of Saint Mary's Bayou would be useless until the depth across the reef was correspondingly increased. Of the three channels, the one near Matagorda peninsula is most susceptible of improvement, the reef being of sand at this point, and the distance to deep water on either side not very great.

Saint Mary's Bayou empties into Matagorda Bay, at the town of Matagorda, and inside of the bar has a depth of more than 16 feet. The left bank is several feet high with an abrupt slope toward the bayou at Matagorda street, but is low and flat above and below, where it is generally overflowed during high river. The right bank, except directly opposite Matagorda street, is low and marshy, and is covered with tall reeds, which grow some distance into the bayou and bay, but opposite that street there is a high ridge which runs parallel to the shore, is partly cultivated, and has some timber upon it. Several years ago the sediment from the east branch of the Colorado River was swept to the northeastward and deposited in front of the bayou, which succeeded in almost closing the entrance, but recently the river broke into the bayou through a small canal so that now the bayou is virtually one of its mouths. Since the crevasse was formed uniting the river and bayou there has been an increased depth of water across the bar, due to the current during freshets. At present there is a channel of 2 feet depth across the bar at mean low-tide, but during the extreme low-water of winter caused by northers the bar itself is visible above the water surface.

Matagorda is a town of 500 inhabitants, is situated on the left bank of Saint Mary's Bayou at its mouth, and is the county seat of Matagorda County. According to the statements of its citizens it was once a thriving town, with a depth of channel across the bar of 3½ or 4 feet, but during the gradual shoaling of the entrance of the bayou has dwindled into insignificance.

The soil of Matagorda County is black and red loam, and is very fertile. It is principally a cotton-growing and cattle-raising county, and produced last year 12,000 bales of cotton, which, on account of the shoal water on the bar, was carried by rail to market.

The banks of the Colorado River are covered with brush, principally willow, hackberry, and elm, and gravel, shell, and sand are to be found in large quantities in the vicinity of its mouth. There is no stone to be found for some distance up the river.

PROPOSED IMPROVEMENT.

Improvement by means of jetties would have to depend for its success upon ebb-tide currents strong enough to produce the required scour, but the bayou does not form a reservoir sufficient for the reception of any considerable amount of flood-water, and hence cannot give any great velocity of ebb-current. Any strong currents would be due to freshets, which are unreliable, and occur only during a portion of the year. In view of these facts, dredging would seem to be the best means of deepening the channel across the bar. The material of the bar being stiff mud would probably remain open some time without revetment.

The estimate for dredging a channel 3 feet in depth, 100 feet wide at bottom, and slope 1 on 2, is as follows:

30,700 cubic yards, at 25 cents	$7,675 00
Cost of transporting dredge	1,000 00
	8,675 00
Add about 15 per cent. for contingencies, &c	1,325 00
Total cost	10,000 00

The actual amount of dredging for a 3-foot channel is 8,985 cubic yards, but on account of the shoalness of the water it will be necessary to excavate a much larger amount to allow a dredge to pass through the cut. The estimate is made for a channel of 3 feet depth, as that is the greatest depth that can be carried across the reef.

I would respectfully call attention to the statement of some of the merchants of Matagorda as to the amount of business of the place, both present and prospective. They are very anxious for the improvement of the channel and greatly assisted me during the survey.

I am considerably indebted to Mr. W. A. Carter for furnishing me with statistics, &c., and to Mr. J. H. Selkirk for county and city maps.

I was assisted on the survey by Mr. H. B. Wright, who acted in the capacity of rodman, and displayed great energy and interest in his work.

Very respectfully, your obedient servant,

JOHN M. PICTON,
United States Assistant Engineer.

Bvt. Lt. Col. S. M. MANSFIELD,
Major of Engineers, U. S. A.

47TH CONGRESS, 1st Session. } SENATE. { EX. DOC. No. 14.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING,

For the consideration of Congress, a copy of Senate Ex. Doc., No. 149, 46th Congress, 2d session, transmitted in response to Senate resolution of April 9th, 1880, relative to the action taken by that department in adopting Sawyer's improved canister, and as to the justice of compensating for same.

DECEMBER 15, 1881.—Referred to the Committee on Patents and ordered to be printed.

WAR DEPARTMENT,
Washington City, December 13, 1881.

SIR: I have the honor to inclose herewith, for consideration by the United States Senate of the subject therein presented, a copy of Senate Ex. Doc. No. 149, 46th Congress, 2d session, the same being a letter from the Secretary of War of April 12, 1880, in response to a resolution of the Senate of April 9, 1880, as follows:

That the Secretary of War be directed to inform the Senate what has been the action of his department in adopting Sawyer's improved canister, and his opinion as to the justice of compensating said Sawyer for his invention.

Having, myself, carefully considered the subject, I am led to concur fully in the views of my predecessor, as expressed in the inclosed document, and to renew the recommendation that Mr. Sawyer be reimbursed in such sum as Congress may deem adequate, or that the Secretary of War be authorized to pay him such sum as, after investigation, may be found sufficient to reimburse him for his expenses in perfecting his invention.

Very respectfully, your obedient servant,

ROBERT T. LINCOLN,
Secretary of War.

The PRESIDENT *pro tempore*
of the United States Senate.

[S. Ex. Doc. No. 149, 46th Congress, 2d session.]

WAR DEPARTMENT,
Washington City, April 12, 1880.

The Secretary of War has the honor to respond to Senate resolution of April 9, 1880, directing—

"That the Secretary of War be directed to inform the Senate what has been the action of his department in adopting Sawyer's improved canister, and his opinion as to the justice of compensating said Sawyer for his invention."

This subject has heretofore been considered by this department, and from reports thereon by the Chief of Ordnance, dated respectively February 11 and December 11, 1879 (copies of which are herewith inclosed), it is shown that the first purchase of 1,000 Sawyer canister was based upon the recommendation of an ordnance board convened in December, 1877, and that in a report of a similar board, dated December 14, 1878, it was recommended "that when canister is called for only that of the Sawyer pattern be issued." The reports further show that the Sawyer canister are regarded by the Chief of Ordnance as being unquestionably the most efficient known to his department, and that he is of the opinion that they should supersede all others in use. Copies of the reports of the ordnance boards above referred to were, under date of February 14, 1879, transmitted to the chairman of the Senate Committee on Military Affairs, by the Secretary of War, in response to a resolution of the Senate of February 5, 1879.

Under date of the 8th instant, a letter, an extract from which is inclosed, was addressed by Mr. Sawyer to this department, in which he refers to certain expenses incurred by him in perfecting his invention, and for which he claims that he should be reimbursed by the government.

The Acting Chief of Ordnance, to whom Mr. Sawyer's letter was referred, reports that the department has no canister shot and no money with which to purchase them, except as may be needed for the very few (less than 1,000) for the authorized yearly target practice; that Mr. Sawyer should he compensated for his labor and time in perfecting his invention, but that it can only be done by a special appropriation of money to purchase with or by an act giving him direct compensation. The report concludes as follows:

"Experimenting with cannon or projectiles is necessarily a very expensive business, and, in every case, much money and time have to be expended in perfecting the simplest instruments of modern warfare. As I have no means of knowing what Mr. Sawyer has expended, other than what is stated by him—and I have no reason to doubt that his figures are correct—I can only say in general terms that his compensation should not be less than what he has actually spent in perfecting his shot."

The department having no funds with which to purchase annually more of the Sawyer canister than are necessary for current use, the purchases thus far aggregating only about 2,000—a little more than a two years' supply—the views of the Acting Chief of Ordnance that Mr. Sawyer should be compensated for his labor and time in perfecting his invention are concurred in, and it is accordingly recommended that he be reimbursed in such sum as Congress may deem adequate, or that the Secretary of War be authorized to pay him such sum as, after investigation, may be found sufficient to reimburse him for his expenses in perfecting his invention.

ALEX. RAMSEY,
Secretary of War.

The PRESIDENT *pro tempore*
of the United States Senate.

WASHINGTON, *April* 8, 1880.

Hon. ALEXANDER RAMSEY,
Secretary of War:

SIR: * * * I would state that the invention was made and perfected in the year of 1864, by using the 10 and 20 pounder guns, testing many canister of my invention, and the service on water and targets, making quite an outlay of money in powder, canister, targets, and other incidental expenses.

Realizing the great superiority of my canister, I constructed 1,000 each for the 10 and 20 pounder guns (supposing that the government would take them at once), taking the first finished of sufficient quantity for a thorough test, and brought them to Washington for approval.

Tests were made December 1, 1864, resulting in demonstrating the great superiority of my invention (see records of Ordnance Department).

To my great surprise, on application to the department for orders, I found that the service canister was good enough, they needed none better; thus leaving all this accumulated expense, amounting to near $6,000, that I had left on my hands without any recompense.

In the year 1877 I constructed a sufficient number of canister of my invention and brought them to the notice of the department. The results of tests that followed and the recommendations made I presume you are familiar with.

As above stated, I constructed 2,000 in 1864; they were afterward broken up and sold for old iron. The malleable iron castings cost 14 cents per pound, so that the expense of making and boxing them amounted to $3,580.

I have no doubt whatever that I expended upwards of $1,500 in testing them at home at this time, and canister furnished for tests December 1, 1864, and my personal

expenses at that and other times during the winter of 1864 and 1865, must have been more than $600.

I have also expended, at the most moderate calculation, from $3,000 to $4,000 recently, before the final recognition and adoption of the invention by the government. I have not included in the above estimate any recompense for my own time, a great many months of which have been devoted to perfecting and advancing this invention.

* * * * * * *

Your obedient servant,

A. M. SAWYER,
Athol, Mass.

NATIONAL HOTEL, *Washington, D. C.*

ORDNANCE OFFICE, WAR DEPARTMENT,
Washington, December 11, 1879.

Respectfully returned to the Secretary of War.

I can add nothing to the views expressed in my indorsement of the 11th February last (copy inclosed) on a Senate resolution. The current wants of the service for the Sawyer canister can be supplied out of the usual appropriations. One thousand have been recently ordered as an ample supply for the present year.

It is for Congress to decide whether a special appropriation shall be made for their purchase in considerable quantities, as compensation for money expended in perfecting the invention, the government being the only purchaser.

S. V. BENÉT,
Brigadier-General, Chief of Ordnance.

ORDNANCE OFFICE, WAR DDPARTMENT,
Washington, February 11, 1879.

Respectfully returned to the Secretary of War.

On the supposition that this resolution has reference to the Sawyer canister, it being the only canister of improved pattern that has been before the department, I herewith inclose:

1. A copy of report of a board that convened in December, 1877, and upon whose recommendation 1,000 3-inch canister were ordered and are now in service.
2. Extract from report of the ordnance board of April, 1878.
3. Extract from report of the ordnance board of December 14, 1878, recommending "that when canister is called for only that of the Sawyer pattern be issued," &c.

There can be no question that the Sawyer is the most efficient canister known to this department, and should supersede all others in use. As to the expediency of authorizing the purchase of a supply, it is respecfully submitted:

1. That having purchased only 1,000, rather more than one year's consumption, we have none in store.
2. That the canister not being of a perishable nature, can be stored an indefinite period without deterioration or loss.
3. That we have no money with which to purchase annually more than what is necessary for current use, and that if a large amount, many thousand, were to be purchased, a special appropriation would be necessary.
4. The inventor informs me that he has spent about $5,000 in perfecting his invention; that although his invention has nearly seventeen years to run, no sales can be made to any one but the government, and that unless the United States makes a large purchase in order to remunerate him, his will be an expenditure of time and money without a hope of compensation. For this reason his case should receive consideratlon.

S. V. BENÉT,
Brigadier-General, Chief of Ordnance.

47TH CONGRESS, 1st Session. } SENATE. { Ex. Doc. 14, Part 2.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING

Copies of letters dated May 10 *and December* 13, 1880, *relative to Sawyer's improved canister.*

JANUARY 24, 1882.—Referred to the Committee on Patents and ordered to be printed.

WAR DEPARTMENT,
Washington City, January 20, 1882.

The Secretary of War has the honor to transmit to Congress, in connection with his letter of the 13th ultimo (published in Senate Executive Document No. 14, Forty-seventh Congress, first session), relative to Sawyer's improved canister, copies of the letters of his predecessor on the subject, dated, respectively, May 10 and December 13, 1880, which were inadvertently omitted when said letter was written.

ROBERT T. LINCOLN,
Secretary of War.

The PRESIDENT *pro tempore*
of the United States Senate.

WAR DEPARTMENT,
Washington City, December 13, 1880.

SIR: I have the honor to acknowledge the receipt of the resolution of the House of Representatives of the 9th instant, as follows:

"*Resolved*, That the Secretary of War be directed to inform the House of the facts known to his department in regard to the character and value of Sawyer's canister shot and its adoption by the government, and to communicate his opinion as to the justice and expediency of purchasing the same by the United States or otherwise reimbursing said Sawyer therefor."

In reply, I have the honor to inclose copies of all papers in the case, giving the facts in regard to the character and value of the Sawyer canister shot.

On reference of the resolution to the Chief of Ordnance he reports as follows:

"As to the justice and expediency of purchasing the same by the United States, or otherwise reimbursing Mr. Sawyer therefor, I respectfully refer to letter from War Department to President of the Senate of April 12, 1880, herewith, embodying the views held by this office; also to my indorsement herewith of May 4 and May 6, 1880, and to my letter to Mr. Sawyer of April 24, 1880. Nothing can be added to what is here stated in advocacy of favorable consideration. The amendment in regard to it which passed the Senate June 10, 1880, appropriating 'not exceeding $25,000' is recommended."

Concurring in the views of the Chief of Ordnance, I beg to invite attention to the recommendation contained in my letter of April 12, 1880 (herewith), which is renewed.

Very respectfully, your obedient servant,

ALEX. RAMSAY,
Secretary of War.

The SPEAKER
of the House of Representatives.

WAR DEPARTMENT,
Washington City, May 10, 1880.

SIR: I have the honor to inform yon that Hon. Leopold Morse has requested me to inform the Committee on Appropriations, House of Representatives, whether the department deems it desirable or just that the government should acquire the patent of Sawyer's canister shot, at a sum to be fixed by me, within certain limits which will afford reasonable compensation to the inventor, and, if so, what would be a suitable limit.

In response to the communication above referred to, I beg to invite the attention of the committee to the report of the Chief of Ordnance on this matter, as follows:

"This office has expressed itself favorable to an appropriation that will reimburse Mr. Sawyer for the expense incurred in making and protecting his invention.

"In time of peace the number of canisters for current use will not be more than one thousand a year.

"Allowing ten per cent. of cost as royalty would be fifteen cents (15) each, or one hundred and fifty dollars ($150) a year, and for seventeen (17) years, the life of the patent, would amount to $2,550.

"In all probability the United States will be the only purchaser in this country during the life of the patent. Should the country be engaged in war during that period the Sawyer canister would no doubt be used in large numbers, but war is a possibility only.

"Under all circumstances $5,000 would be a fair price, and it would be well to purchase the patent or acquire for the United States the right to use it at that price.

"Mr. Sawyer assures me that the cost to him in money, in inventing and perfecting his invention, is more than $15,000. In my opinion $5,000 is a fair price for the right to use the patent by the United States, and therefore that $20,000 should be appropriated.

"As to the value of this canister to the Navy, I am not a fair judge, and did not consider it in determining upon the price."

It will be seen from the above, that the Chief of Ordnance has not taken into consideration the advantage to the naval service of this invention, and therefore in passing on the case Congress may consider this is an item that should enter into the case.

Very respectfully, your obedient servant,

ALEX. RAMSEY,
Secretary of War.

Hon. J. D. C. ATKINS,
Chairman Committee on Appropriations,
House of Representatives.

47TH CONGRESS, 1st Session. } SENATE. { EX. DOC. No. 15.

MESSAGE

FROM THE

PRESIDENT OF THE UNITED STATES,

TRANSMITTING

A communication from the Secretary of the Interior, in reference to the applications of the Chicago, Texas and Mexican Central, and the Saint Louis and San Francisco Railway Companies, for a right of way across the lands of the Choctaw Nation, in the Indian Territory.

DECEMBER 15, 1881.—Read, and referred to the Committee on Railroads and ordered to be printed.

To the Senate and House of Representatives:

I transmit herewith a communication from the Secretary of the Interior, with accompanying papers, in reference to the applications of the Chicago, Texas and Mexican Central, and the Saint Louis and San Francisco Railway Companies, for a right of way across the lands of the Choctaw Nation, in the Indian Territory, for the building of a proposed railroad and telegraph line.

The matter is commended to the careful attention of Congress.

CHESTER A. ARTHUR.

EXECUTIVE MANSION,
December 15, 1881.

DEPARTMENT OF THE INTERIOR,
Washington, December 13, 1881.

SIR: I have the honor to inclose, for your information and such action as you may deem proper, duplicate copies of the report of U. J. Baxter, designated, under your instructions of the 8th and 20th of October last, respectively, as a special agent of this department to present to the proper authorities of the Choctaw Nation, in the Indian Territory, the respective applications of the Chicago, Texas and Mexican Central and the Saint Louis and San Francisco Railway Companies, for a right of way across the lands of said nation for the building of a proposed railroad and telegraph line.

Accompanying the same will be found copies of the applications, of the instructions to Mr. Baxter, and of all the papers and correspondence attached to and made a part of his report; also, a copy of the bill passed by general council and approved by the principal chief, granting such right of way to the Saint Louis and San Francisco Railway Company, subject, by express provisions therein contained, to further consideration and ratification by the Congress of the United States.

The whole matter has been examined by the Commissioner of Indian Affairs, and I inclose copies of his report of 12th instant, in favor of the proposed legislation, in which I concur.

Should the terms of the measure meet your approval, I suggest that the same be recommended to the favorable consideration of Congress.

Very respectfully, your obedient servant,

S. J. KIRKWOOD,
Secretary.

The PRESIDENT.

DEPARTMENT OF THE INTERIOR,
OFFICE OF INDIAN AFFAIRS,
Washington, December 12, 1881.

SIR: I am in receipt, by department reference, for report, of a letter from U. J. Baxter, esq., special agent of the department, dated the 30th ultimo, submitting the result of his negotiations with the authorities of the Choctaw Nation respecting the grant of a right of way to the Saint Louis and San Francisco Railway Company through the lands of said nation in the Indian Territory; also, of an official copy of the bill passed by both houses of the Choctaw legislature granting such right of way, together with sundry other papers elucidating the matter contained in said letter.

The bill in question, which bears the approval of the principal chief of the Choctaw Nation, under date of the 10th ultimo, provides (subject to certain stipulations and agreements therein contained) for the grant of a right of way to the Saint Louis and San Francisco Railway Company, a corporation duly organized under the laws of the State of Missouri, for the construction of a railroad and telegraph line; said right of way to be 200 feet in width through the Choctaw Nation, and 400 feet in width at each station for a distance of 4,000 feet in length; said right of way to commence at a point to be selected by said company on the line of said nation immediately contiguous to Sebastian or Scott Counties, in the State of Arkansas, and run thence in a southwesterly direction on the most direct and practicable route through the Choctaw Nation, in the general direction of Paris, in the State of Texas, and to continue to or connect with a proposed road from the city of Paris aforesaid.

For this grant the said railway company is to pay quarter-annually to the national treasurer of said nation, to be used for the benefit of schools therein, the sum of $500; and until the first of such payments is made no right or power to enter upon said lands, except for the purpose of surveying and locating the line of road and telegraph, is to be acquired under the provisions of the act, which is also subject to ratification by Congress.

In reply to your inquiry whether, in the opinion of this office, there are any legal or other objections to the proposed grant, I have to say that I know of none. The treaty provisions for railroads through the Choctaw country (Article VI, treaty April 28, 1866, 14 Stat., 769), being held by the department to have been exhausted by the location of existing roads under legislative authority and Executive sanction, the grant of a right of way in the present instance would, as stated in department letter to the President of the 20th October last, appear to legitimately fall within the scope of the general power reserved to the nation by the fourth sub-

division of Article VIII of the treaty to legislate for the construction "of works of internal improvement," governed by the limitations of Article XLIII, respecting interference by the United States authorities with such legislation.

I will add that the interests of the Choctaws appear to have been fully cared for, and the reports accompanying the papers show that the bill as passed meets the approval of the nation generally.

The papers transmitted by you are herewith returned, and a copy of this report is inclosed.

Very respectfully, your obedient servant,

H. P. RICE,
Commissioner.

The SECRETARY OF THE INTERIOR.

WASHINGTON, D. C., *September* 30, 1881.

SIR: The Chicago, Texas and Mexican Central Railway Company, an existing corporation, duly organized pursuant to the general laws of the State of Texas, represents

That said company is organized for the construction and operation of a railroad from a point on the Rio Grande River, Texas, running northeasterly to a point in Lamar County, in said State, as shown on the accompanying map; thence to Fort Smith, in Arkansas, and from thence, by connecting lines now building, to the city of Chicago; the design thereof being to connect said city with the commerce of Texas and Mexico, upon the most direct and practicable railroad route.

That in the construction of said railroad from the northeastern boundary of Texas to Fort Smith, Arkansas, it is found necessary to construct the same across the southeastern portion of the Indian Territory, through the domain of the Choctaw and Chickasaw Indians.

That such necessity exists:

1. Because the surrounding country, outside said Territory, is rough and mountainous, and the construction of a railroad through the same would involve an enormous cost; and,

2. Construction upon such route would require great divergence from a direct air-line, thus largely increasing the length of said roads.

That by the treaty of 1866, with said Indian nations, authority was given for the construction of one railroad north and south, and one railroad east and west, through said Territory; and that by subsequent executive action the franchise thus created was bestowed upon certain corporations, and the said railroads since constructed in whole or in part.

That section 2116, Revised Statutes, provides that "no purchase, grant, lease, or other conveyance of lands, or of any title or claim thereto, from any Indian nation or tribe of Indians, shall be of any validity in law or equity unless the same be made by treaty or convention entered into pursuant to the Constitution"; and severe penalties are imposed for any infringement of this statutory prohibition.

The said Chicago, Texas and Mexican Central Railway Company is earnestly desirous of securing the lawful right to construct and operate said road through the Territory named; but inasmuch as authority to so construct said railroad is not recognized by any existing treaty, and as the purchase of the necessary right of way involves the acquisition of a property right in the lands of said Indian nation, it can proceed only under the provision of law above quoted.

Therefore said company respectfully requests that you will at once authorize an officer of your department, or your petitioner, to proceed to said Indian Territory and conduct and complete the necessary negotiations with said Indian nations for the purchase of the desired right of way by said company, and that you will thereafter report the same to Congress for ratification.

Necessity for prompt action exists, as the Choctaw legislature, with whom your agent must deal, will begin its session on October 8th, proximo.

Said company is ready and willing to guarantee its good faith in the premises in such manner as you may designate, and to secure the United States against all cost in the premises.

DWIGHT K. TRIPP,
General Solicitor.

Address Britton & Gray, of counsel, Washington, D. C.

The SECRETARY OF THE INTERIOR.

DEPARTMENT OF THE INTERIOR,
Washington, October 6, 1881.

SIR: I have the honor to submit for your consideration a communication dated 30th ultimo, from Dwight K. Tripp, general solicitor of the Chicago, Texas and Mexican Central Railway Company, alleging due organization under the laws of Texas; setting forth the purposes of its existence, the proposed terminal and connecting points of its line, and generally the advantages of its route in aid of the necessities of commerce, and asking, in view of the great difficulties of construction and the obvious objections to a deflection from a direct line, that permission be obtained, through the intervention fo the government, to cross the southeastern portion of the lands of the Choctaw Nation, in the Indian Territory, so as to reach from a point on the Rio Grande River, in the State of Texas, a direct connection at Fort Smith, in the State of Arkansas, with regular lines to Saint Louis and Chicago.

Article VI of the treaty of April 28, 1866 (14 Stat., 769), with the Choctaws and Chickasaws, grants a right of way for certain roads which by legislative authority have been duly located under executive sanction, which action is considered as having exhausted the treaty provision for railroads through these nations.

There remains but the general power reserved to the nations or tribes by the fourth subdivision of Article VIII of the treaty to legislate for "the construction of works of internal improvement," governed by the limitation of Article XLIII, respecting interference by the United States authorities with such legislation.

From a consideration of the application, I am of the opinion that the material interests of the people of the United States as well as the prosperity of the Indians, would be promoted by the building of the proposed road; and as I am advised that the national council of the tribe will be during the present month engaged in annual session, I have to recommend, if in consonance with your views, that an officer or employé of this department may be authorized to confer with said council, and negotiate on behalf of the United States an agreement with said Indians for the necessary right of way, to be duly submitted to Congress for its ratification.

I understand that all expenses attending the proposed negotiations can be met without causing any deficiency for which Congress may hereafter be called upon to make appropriation.

Very respectfully,

S. J. KIRKWOOD,
Secretary.

The PRESIDENT.

EXECUTIVE MANSION,
October 8, 1881.

I concur in the views of the Secretary of the Interior herein expressed, and, in accordance with his recommendation, direct that he detail some suitable officer or officers of his department to make the contemplated negotiations with the Indians of the Indian Territory mentioned therein, in conformity to general laws and the present treaty stipulations with said Indians; the whole subject to be submitted to Congress.

CHESTER A. ARTHUR.

DEPARTMENT OF THE INTERIOR,
Washington, October 10, 1881.

SIR: You are hereby detailed from your present duty as a clerk in this department, and will proceed to the seat of government of the Choctaw Nation in the Indian Territory, for special service, concerning which, full instructions will be given you this day.

Very respectfully,

S. J. KIRKWOOD,
Secretary.

Mr. URI J. BAXTER,
Secretary's Office. Present.

DEPARTMENT OF THE INTERIOR,
Washington, October 10, 1881.

SIR: The President of the United States, on the 8th instant, authorized the negotiation of an agreement with the proper authorities of the Choctaw Nation, to be submitted to Congress for its sanction and ratification, providing for a right of way for a proposed railroad and telegraph line through the lands of said nation, in the Indian Territory, to be constructed by the Chicago, Texas and Mexican Central Railway Company. I have, in pursuance of such authority, designated you as a proper person

to represent this department in conducting the proposed negotiations, and have to direct that you proceed to the Choctaw seat of government, and, having made all necessary preliminary arrangements, that you confer with such agents or commissioners on the part of said nation as may be lawfully recognized for such purpose, and after fully considering the various matters relating to the object in view, and clearly representing the advantages and benefits expected to accrue to the people of the United States and of said nation from the construction of such road and telegraph line, that, in case you shall be able to agree upon the terms thereof, you conclude with the said representatives a proper agreement, in due form and execution, covering the necessary provisions, conditions, and stipulations, to be submitted, with your report thereon, for my approval, and for submission thereafter to the President and to Congress.

You are specially charged to conform as near as may be to present treaty stipulations with the said Indians, making no unnecessary changes in existing law, and strictly confining yourself to the legitimate object of your appointment, being governed by the papers and correspondence with the President and this department, copies of which are herewith furnished for your information.

You will call upon the Indian agent at Muscogee for such aid and assistance as you may require at his hands; and in case it shall be deemed necessary he will accompany you to the nation and assist in your negotiations. He will also detail an interpreter and such other employés of his office as may be required.

You will make full and accurate report of all your proceedings in conducting said negotiations. Your salary as law clerk of this department will continue while engaged in this employment. Your necessary expenses will be provided by the railway company in whose behalf the pending negotiations are prosecuted, to whom you will look, without further recourse to this department.

Very respectfully,

S. J. KIRKWOOD,
Secretary.

Mr. URI J. BAXTER. *Present.*

SOUTHERN HOTEL,
Saint Louis, Mo., October 20, 1881.

SIR: I have the honor to report that in obedience to your instructions of 10th instant I left Washington on the following morning, proceeding direct to Chicago. Placing myself in communication with Mr. D. K. Tripp, I proceeded by Thursday's train to Saint Louis, in company with Mr. L. H. Fitzhugh, who had been designated to represent the Chicago, Texas and Mexican Central Railway Company, on whose petition for a right of way through the Choctaw Nation my instructions were predicated; Mr. Tripp remaining in Chicago.

Trains being delayed, we left Saint Louis Friday morning, reaching Muscogee late at night. On Saturday I found Agent Tufts, who went with us by evening train to Caddo, some 12 miles from Armstrong Academy, the seat of the Choctaw national government.

The council not being in session on Sunday, I remained at Caddo, meeting Mr. J. S. Standley, national agent of the Choctaws, and the services of Agent Tufts being no longer necessary, and important business calling him to the Creek Nation, he returned to the agency.

Monday morning, 17th instant, I reached the seat of government, and at once had an interview with J. F. McCurtain, principal chief of the nation, to whom I exhibited my instructions, Hon. Allen Wright, superintendent of public schools, acting as interpreter; for although Governor McCurtain speaks good English, he preferred to get a fuller understanding in his own tongue of the propositions submitted.

After hearing the same, as embodied in your communication to the President of the 6th instant, and sanctioned by the Executive indorsement, he politely informed me that he had no authority to negotiate an agreement, the whole political power being lodged in the national council by the constitution and laws of the nation, and that he would at a later hour give me a more formal reply.

After consideration and consultation with his advisers, he informed me of his desire that I should address his people that evening in the representatives' hall, and they were accordingly assembled.

At the appointed hour I proceeded, speaking through an interpreter, to lay the whole subject before them, urging your desire to confer with them in all fairness for securing an outlet through their nation for the pressing necessities of commercial traffic and industrial supply, and of your fixed determination, as declared both by your written and verbal instructions to myself, that full protection to their persons, property, and interests shall be definitely and specifically guaranteed as fundamental conditions in any grant of the contemplated right of way.

At the same time I endeavored to explain the position of the department (which I found had been seriously questioned), to the effect that the action of 1870 with respect

to the two roads was exhaustive of treaty stipulations respecting railroad rights of way in their country, and that now the only clear and legal course of procedure must lie in a new provision, by some form of agreement, through the agency of the general government.

I found their ideas very crude on this point. Some, and perhaps the best informed among them, were of opinion that the 18th article of the treaty of 1855 provided still existing rights of way for corporations and the government. Yet this opinion was confused and clouded with the inconsistent belief that for the enjoyment of such right an act of their national council is requisite to make a new grant of power and franchises. It was not apparent to them until after several attempts to explain the matter that the joint or rather concurrent action of the United States Government and of the Choctaw council must be had to give effect to any provision sought to be made.

Considerable remark was indulged in by members of the council, citizens, and others, showing to my mind that the idea of independent action through the Choctaw legislature granting a right of way subject to subsequent approval by the Secretary of the Interior and further ratification by Congress, but procured in the first instance by the efforts of the railroad companies themselves, without reference to your authority and supervision, was generally prevailing among the people; and that this idea had been and was being sedulously presented and defended by agents of one or more railroad companies seeking to obtain such action by the council.

The point seemed to be, that after such grant by the Indian Nation the consent of the Interior Department and of Congress would not be withheld, however the preliminary proceedings might have been prosecuted and the legislative action obtained.

This view was openly advanced by Mr. S. J. Wright, of Paris, Tex., who was permitted by the principal chief to address the meeting, and who appeared to advocate the grant of a right of way to the Saint Louis and San Francisco Railway Company instead of to the Chicago, Texas and Mexican Central. It would have been extremely impolitic to make objection to the informal discussion of these matters. The presentation of the conflicting views had the effect to indicate more clearly the drift and sentiment of the people, and to bring their minds to weigh the several issues thus sharply defined at the outset.

At a late hour the meeting adjourned, and I was advised that the principal chief would give me a letter to you, setting forth his views and conclusions. This he did on the next morning, and I have the honor to forward the same, dated the 17th instant, for your consideration. It will be found to embody the prevalent idea above spoken of, modified by an apparently newly-conceived opinion that, after all, the importance and necessity of securing the recognition and supervision of the general government cannot be entirely overlooked and ignored. It is easy to see, however, that he is yet in doubt as to the proper procedure, and is willing to adopt the conclusion that an agent of your department should in some way conduct the negotiations, although the choice of the corporate grantee should be left to the nation.

I had several informal talks with the authorities and with individual members of the council. I gather the opinion that great effort has been made during several months to gain support for a grant of a right of way to the Saint Louis and San Francisco Railway Company, and that there is, perhaps, a bare majority of the legislature in its favor. On the other hand, it is not entirely certain that there is such majority. I have considerable doubt whether such is the case. Whether undue influences have been used I am unable to say. Rumor is always more or less rife concerning such enterprises; but nothing tangible has been brought to my notice. I think whatever of popular favor has grown up has been generated during the election campaign, and may be said to have arisen naturally from the popular discussions attending a change of administration.

While there is much favor for the Saint Louis and San Francisco Company, there is, in my judgment, less preference as to companies than the letter of the chief would appear to indicate; and I apprehend that some members of the council who now avowedly oppose any grant of right whatever, would consent to favor a fair proposition presented by the government in the manner in which we have proceeded. I was privately assured that the opposition was based more on want of guarantees than on real hostility to such a grant.

Having received the answer of the principal chief, I deemed it best to return to this point, which I reached last evening, and where I am in receipt of your telegrams of this date.

This was also in accordance with the desire of the representative of the railway company, and of Mr. Wright, speaking for the Saint Louis and San Francisco Railway Company, who accompanied Mr. Fitzhugh and myself on our return, and who wished to confer here with representatives of each road, to see if an amicable arrangement can be reached by which the right of way may be honorably secured during the present session of the Choctaw council.

Mr. Tripp is already here, and I understand negotiations are in progress. Should such arrangements be made, I will immediately lay the same before you.

Should the proposed amicable adjustment fail, I am of opinion that no right of way should be granted to any company without express provision, in order to secure the paramount interests of the government and the protection of the people, that other companies shall be allowed to unite with the corporate grantee on equal terms, in substantially the same manner as provided in the Union Pacific acts, and as suggested in the papers now in my charge.

I have the honor to remain, very respectfully, your obedient servant,

U. J. BAXTER.

Hon. S. J. KIRKWOOD,
Secretary of the Interior.

EXECUTIVE OFFICE, CHOCTAW NATION,
October 17, 1881.

SIR: Mr. Uri J. Baxter, accompanied by a representative of the Chicago, Texas and Mexican Central Railway Company, has appeared and presented his commission from your office, and the object of his mission, viz, to conduct negotiations between the Choctaw Nation and the United States for a grant of right of way through said nation to said company. The general council of the Choctaw Nation are now in session in this place—Armstrong Academy—and have not as yet indicated any desire or purpose to grant a right of way to any company; and in due deference to their authority I shall have to decline to anticipate them, at least while they are in session, though I may say in this connection, in an official way, as the chief executive officer of the Choctaw Nation, that I do not believe the Choctaw people are averse to granting a right of way to some company. You are perhaps not aware that there are a multiplicity of interests here, and all in conflict; that there are other companies desirous of securing the same right of way as the Chicago, Texas and Mexican Central Railway Company desire to secure. Such, however, is the case. I do not understand that you, by sending Mr. Baxter here upon an application of the Chicago, Texas and Mexican Central Railway Company, intend and propose to give said company precedence and preference over any other company, and to the exclusion of any other company. I take it that yourself and the President both desire that the Choctaws shall first be satisfied, and that if the proposition of some other company is more satisfactory to the Choctaws than that of the said Chicago, Texas and Mexican Central Railway Company, then the consent of the government will not be withheld from any arrangement which the Choctaws may make with any other company for a right of way through their nation on the proposed route, whereby the rights and interests of all parties are secured and guaranteed in accordance with the laws and treaties, rules and regulations of your department of the general government.

Of course I understand that whatever is done must be done with the express condition and stipulation that it shall be invalid unless ratified and sanctioned by the United States Government; and I think all the railroad companies and the general council of the Choctaw Nation so understand it. There is no purpose or desire to ignore the authority of your department and the United States Government.

Since Mr. Baxter has come here the subject of a right of way has excited a good deal of interest, and many opinions have been expressed by the people and members of the general council privately; and with all due deference and respect to yourself and the President, and the Chicago, Texas and Mexican Central Railway Company, my candor forces me to say to you that the Saint Louis and San Francisco Railway Company is much more popular here than the former company, and is the only company which is at all likely to succeed here in securing the right of way. I think Mr. Baxter will unite with me in my view.

Now, while, as I said before, the Choctaws are not averse to granting a right of way, yet this multiplicity of interests by their conflict and opposition to each other may defeat any action being taken at all; and in view of this contingency I would most respectfully suggest that Mr. Baxter be granted general powers to superintend the negotiations in behalf of any other company for the same right of way, leaving the selection of that company to the Choctaws.

It seems to be the general purpose to have something done at this session of the council on this subject of a right of way.

Very respectfully,

J. F. MCCURTAIN,
Principal Chief Choctaw Nation.

Hon. S. J. KIRKWOOD,
Secretary of the Interior, Washington, D. C.

SOUTHERN HOTEL,
Saint Louis, Mo., October 21, 1881.

SIR: I have the honor to report further with respect to the pending negotiations for securing the right of way for the Chicago, Texas and Mexican Central Railway through the lands of the Choctaw Nation.

I learned at this afternoon's conference that the enclosed draft of a bill had been months ago universally distributed throughout the nation; which, in view of the statement of the principal chief in his letter to you, that nothing had yet been presented to his people, and of the fact that I had not until to-day known of the existence of such a document, indicated that some design to conceal the same from me may have prevented earlier knowledge of its contents. Had I known their purport I should have pointed out to the Indians the inadequacy of its provisions for their proper security and protection. Some of the defects I have hastily entered as marginal notes on the copy herewith.

I learned from your dispatches that the Saint Louis and San Francisco Railway Company has profited by the conference had by me with the people, as recited in my report of yesterday and has applied in proper form for your sanction and approval. I gather also from the tone of your dispatches that you have considered the various suggestions and propositions growing out of the action already taken, and that my instructions will indicate fully and clearly your views and intentions. I shall cheerfully and faithfully undertake whatever may be embodied therein; and hope to justify the confidence reposed in me by yourself and the representatives of the rival interests. I had hoped that they would unite on an amicable basis, and am persuaded that their mutual interests would be best conserved by such agreement. The conference between them I do not understand to have been finally closed, yet I do not, as at present advised, feel very confident of the result. Without harmonious action on their part, the alarm of the Choctaw people will be likely to be aroused, and both companies will probably fail.

I have the honor to remain, very respectfully, your obedient servant,

U. J. BAXTER.

Hon. S. J. KIRKWOOD,
Secretary of the Interior.

[President's Office, Saint Louis and San Francisco Railway Company, Drexel Building, Corner Wall and Broad streets, New York.]

NEW YORK, *October* 18, 1881.

DEAR SIR: I beg to apply for authority, subject to the approval of the President, for this company to treat with the Choctaw Nation for the right of way for our road through its territory.

Our road is now completed and in operation to Fayetteville, Ark., and is in process of construction southwardly from that point.

Very respectfully, your obedient servant,

E. F. WINSLOW.
President.

Hon. SAMUEL J. KIRKWOOD,
Secretary of the Interior, Washington, D. C.

WASHINGTON, D. C., *October* 20, 1881.

SIR: In reference to the foregoing application of E. F. Winslow, president of the Saint Louis and San Francisco Railway Company, I beg to state that said company is a corporation duly created and existing under and by virtue of the laws of the State of Missouri.

That said company has constructed and now controls a line of railway extending from Plymouth, in Missouri, on its main line, in a southwesterly direction in the States of Missouri and Arkansas, to Fayetteville, in the last-named State, and thence in the same general direction to Fort Smith, in said State.

That said line is completed and in operation to said Fayetteville, being a distance of about seventy miles, and the work of construction southwardly from that point is in an advanced state.

That in the further extension of said railway southwardly from Fort Smith, it is deemed necessary to construct the same across the southeastern portion of the Indian Territory, through the domain of the Choctaw and Chickasaw Nations.

That such necessity exists—

1st. Because the surrounding country outside of said Territory is rough and mountain-

ous, and the construction of a railroad through the same would involve an enormous cost.

2d Construction upon such route would require considerable divergence from a direct air-line, and largely increase the length of said road.

That by the treaty of 1866, with said Indian nations, authority was given for the construction of one railroad north and south, and one railroad east and west, through said Territory; and that by subsequent executive action the franchise thus created was bestowed upon certain corporations, and the said railroads since constructed in whole or in part.

That section 2116. United States Revised Statutes, provides that "No purchase, grant, lease, or other conveyance of lands, or of any title or claim thereto, from any Indian nation or tribe of Indians shall be of any validity in law or equity unless the same be made by treaty or convention entered into pursuant to the Constitution"; and severe penalties are imposed for any infringement of this statutory prohibition.

That said Saint Louis and San Francisco Railway Company is desirous of securing the lawful right to construct and operate its said road south of Fort Smith, Arkansas, through the Territory named; but inasmuch as authority to so construct said railroad is not recognized by any existing treaty, and as the purchase of the necessary right of way involved the acquisition of a property right in the lands of said Indian nations, it can proceed only under the provisions of law above quoted.

Therefore the said Saint Louis and San Francisco Railway Company respectfully requests that you will immediately authorize and appoint an officer of your department, or your petitioner, to proceed to said Indian Territory, and conduct and complete the necessary negotiations with said Indian nations for the purpose of the desired right of way by said company, and that you will thereafter report the same to Congress for ratification.

Necessity for prompt action exists, as the Choctaw legislature, with whom your agent must deal, is now in session and will shortly adjourn.

Said company is ready and willing to guarantee its good faith in the premises, in such manner as you may designate and direct, and to secure the United States against all costs in the premises, and pay the expenses of the negotiation.

Annexed hereto is a map of the line of the Saint Louis and San Francisco Railway, showing in red the general direction of the proposed road.

Very respectfully,

T. W. LILLIE,
Treasurer for Saint Louis and San Francisco Railway Company.

Address E. F. Winslow, president, No. 3 Broad Street, New York.

The SECRETARY OF THE INTERIOR,
Interior Department.

(For map above referred to, see original application on file in Interior Department.
U. J. B.)

DEPARTMENT OF THE INTERIOR,
Washington, October 20, 1881.

SIR: I have the honor to submit for your consideration a communication from Mr. E. F. Winslow, president of the Saint Louis and San Francisco Railway Company, dated the 18th instant, and a further communication from Mr. T. W. Lillie, treasurer of said company, of even date herewith, alleging due organization under the laws of the State of Missouri, setting forth the purposes of its existence and the general direction of the proposed road, and asking, in view of the great difficulties of construction and the obvious objections to a deflection from a direct line, that permission be obtained through the intervention of the government to cross the southeastern portion of the lands of the Choctaw Nation, in the Indian Territory, so as to reach a point south of the Red River in Texas, indicated on the map accompanying said letter and herewith submitted.

Article VI of the treaty of April 28, 1866 (14 Stat., 769), with the Choctaws and Chickasaws, grants a right of way for certain roads which, by legislative authority, have been duly located under executive sanction, which action is considered as having exhausted the treaty provision for railroads through these nations. There remains but the general power reserved to the nations or tribes by the fourth subdivision of Article VIII of the treaty, to legislate for "the construction of works of internal improvement," governed by the limitations of Article XLIII, respecting interference by the United States authorities with such legislation. From a consideration of the application I am of the opinion that the material interests of the people of the United

States, as well as the prosperity of the Indians, would be promoted by the building of the proposed road; and I am advised that the national council of the tribe will be during the present month engaged in annual session in said Territory. I have to recommend, if in consonance with your views, that an officer or employé of this department be authorized to confer with said council and negotiate on behalf of the United States an agreement with said Indians for the necessary right of way, to be duly submitted to Congress for its ratification.

The line proposed by the Saint Louis and San Francisco Railway Company is substantially between the two points designated by the Chicago, Texas and Mexican Central Railway Company, in their application for the appointment of a commissioner to negotiate with the Choctaw Indians, dated September 30, 1881, which was favorably acted upon by you under date of the 8th instant.

I understand that all expenses attendant upon the proposed negotiations can be met without causing any deficiency for which Congress may hereafter be called upon to make appropriation.

I have the honor to be, sir, very respectfully, your obedient servant,

S. J. KIRKWOOD,
Secretary.

The PRESIDENT.

OFFICE OF THE PRESIDENT OF THE UNITED STATES,
October 21, 1881.

I concur in the views of the Secretary of the Interior herein expressed, and in accordance with his recommendation direct that he detail some suitable officer or officers of his department to make the contemplated negotiations with the Indians of the Indian Territory mentioned within, in conformity to general laws and the present treaty stipulations with said Indians, the whole subject to be submitted to Congress.

CHESTER A. ARTHUR.

DEPARTMENT OF THE INTERIOR,
Washington, October 21, 1881.

SIR: I inclose herewith a communication, dated the 18th instant, from Mr. E. F. Winslow, president of the Saint Louis and San Francisco Railway Company, and a further communication, of the 20th instant, from Mr. T. W. Lillie, treasurer of said company, asking, for reasons stated, that the lawful right may be secured to said company to construct and operate its line of road through the southeast portion of the Choctaw country in the Indian Territory.

I also inclose a letter addressed by me to the President of the United States under date of 20th instant, wherein the request of the said railway company is submitted for Executive consideration, with recommendations of the department. The indorsement of the President, concurring in the views of the department, will be found upon the letter addressed to him, and in accordance with the direction given by him you have been designated as the special agent of this department for performing the duties indicated in said letter, which are similar to those contemplated in your letter of instructions of 10th instant.

It will be seen from a perusal of the papers submitted that the request of the Saint Louis and San Francisco Railway Company is almost identical with that of the Chicago, Texas and Mexican Central Railway Company, the negotiation for which, with the Choctaw authorities, was the subject of instructions to you from this department under date of the 10th instant. It must be distinctly understood, however, in this connection, that, so far as this department is concerned, in the matter of the rights and privileges to be secured to these roads, both companies stand equal in its consideration; that with due consideration for the perfect protection of the Indian rights in the case, which is the first care of the government, there is to be no priority or privilege extended to one of the railway companies over the other; and in presenting the cases of the companies to the legislative authorities of the tribe you are to act as a fair and impartial representative of the interests of both, explaining to the Indians plainly and unequivocally the benefits or disadvantages that will accrue to them and to the companies, in your judgment, giving such reasons why the rights should or should not be granted as you may deem fair and just.

Very respectfully,

S. J. KIRKWOOD,
Secretary.

Mr. U. J. BAXTER,
Special Agent of Interior Department, Saint Louis, Mo.

SAINT LOUIS, MO., *October* 24, 1881.

SIR: I have the honor to inclose for the information of the department two copies of proposed bill, as prepared in favor of the Chicago, Texas and Mexican Central Company. The fifth section the Saint Louis and San Francisco manager positively refuses to accept.

I have great hopes that the former company will unite in asking that the latter be granted the right of way, and assist to that end in the pending negotiations.

I expect to leave this evening for the Indian country.

Very respectfully, your obedient servant,

U. J. BAXTER.

Hon. S. J. KIRKWOOD,
Secretary of the Interior.

[Telegram. Western Union Telegrap'a Company.]

WASHINGTON, D. C., *October* 24, 1881.

U. J. BAXTER,
Southern Hotel, Saint Louis, Mo.:

Present fully to Choctaws all information you may have to aid them in determining intelligently whether they will grant right of way to either or both companies. If they determine to do so, then be careful that the agreement is so drawn as not only to give them fair compensation, but also to guard fully all their treaty rights. Take no part in the contest between the companies. Show this to the Choctaws, and give governor a copy.

S. J. KIRKWOOD,
Secretary.

[Telegram. Western Union Telegraph Company. Dated Chicago, Ill., 10, 25, 1880.]

U. J. BAXTER and L. H. FITZBURGH:

Saint Louis and San Francisco Company has agreed with us in relation to our right, and we have decided to withdraw our bill, depending on Congress for protection in case of non-compliance. Therefore you are instructed to withdraw our bill, and give all possible *aid* to pass these.

JNO. T. McCANE,
D. K. TRIPP,
THOS. HOWARD.

EXECUTIVE OFFICE, CHOCTAW NATION,
October 27, 1881.

To the General Council of the Choctaw Nation:

I herewith submit an application of the Saint Louis and San Francisco Railway Company to the Secretary of the Interior for permission to treat with the Choctaw nation for a right of way through said nation for the extension of their line of railway to Texas.

Also, herewith submitted, are a letter from the Secretary of the Interior to the President recommending the granting of the application and the sending of some officer of the Interior Department to superintend the negotiations ,the approval of the President of the same, and a letter of instructions to Mr. U. J. Baxter, who was detailed and commissioned as the special agent of the Interior Department to come here and conduct the negotiations. Mr. Baxter is here, as you all know, for that purpose.

Since I have previously recommended the granting of said right of way, with all needed guarantees, it is needless for me to say much more, except that I am still of that mind. However, I would recommend that some reasonable price per acre be fixed upon the land *for its use*, to be paid by said company. I further recommend that you authorize the appointment of a select and special committee to consist of, say, three of your best business members from each house, who, by conference with Mr. Baxter, will formulate a bill on a plan which will be mutually satisfactory to the Choctaw people, to the United States Government, and the said railway company. I am glad to state to you that the Chicago, Texas and Mexican Central Railway Company have withdrawn their application in favor of the Saint Louis and San Francisco Railway Company.

I am entirely satisfied that all of our rights and interests can and will be protected by the Government of the United States, and, if for no other reason, I think this subject should be seriously considered out of respect to the Government of the United

States, since they have sent a representative here to give us the government's support and assistance.

Suppose we stand up and say we won't have a railroad through our country; can we enforce our purpose? Can we say and believe that Congress has not the power to authorize the construction of a road through our country? If we cannot, then let us do all we can to retain our jurisdiction as long as possible.

Very respectfully, your obedient servant,

J. F. McCURTAIN,
Principal Chief, Choctaw Nation.

I certify that the above is a true and correct copy of the original now on file in my office.

Given under my hand and the great seal of the Choctaw Nation, this November 8, A. D. 1881.

THOMPSON McKINNEY,
National Secretary, Choctaw Nation.

[SEAL.]

SENATE CHAMBER, CHOCTAW NATION,
Chahta Tomaha, I. T., October 28, 1881.

On motion of Senator Jackson, and seconded, a recommendation from the executive office, in reference to the Saint Louis and San Francisco Railway Company, presented by Uri Baxter, by authority of the Interior Department and approved by the President of the United States, and also to appoint a special committee on the same, was read and interpreted.

The president appointed the following named senators to wit: Hon. Sampson Holson, senator, Hon. Ellis Shoat, senator, Hon. T. H. Byington, senator, a special committee on the Saint Louis and San Francisco Railroad Company or bill.

I do hereby certify that this is a true and correct copy of the original on the journal.

D. B. ROBUCK,
Journalist.

REPRESENTATIVE HALL, CHOCTAW NATION.

On the 27th day of October, 1881, a recommendation of the principal chief in regard to the granting of the right of way to the Saint Louis and San Francisco Railway Company was read and interpreted.

In accordance to the same, on the 31st day of October, 1881, the speaker of the house appoints three of the members of the house to confer with United States agent, namely, Messrs. Alfred Wright, J. P. Folsom, and J. W. Everidge.

Attest:

ISHAM WALKER,
Journalist of the House.

ARMSTRONG ACADEMY, CHOCTAW NATION,
November 2, 1881.

The undersigned, duly appointed by the proper authorities of the United States of America, and by the Choctaw Nation, respectively, to confer upon the subject of a right of way to the Saint Louis and San Francisco Railway Company through the lands of said nation, having met and fully considered the same, have agreed to submit, and do hereby report for submission to the general council of the said nation, the following bill to grant a right of way to said company; and we respectfully recommend that the same do pass, subject, as by its terms provided, to its further consideration and ratification by the Congress of the United States.

URI J. BAXTER,
On the part of the United States.

ELLIS CHOATE,
T. H. BYINGTON,
SAMSON HOLSON,
J. W. EVERIDGE,
On the part of the Choctaw Nation.

A BILL to grant a right of way through the Choctaw Nation to the Saint Louis and San Francisco Railway Company.

Whereas, the Saint Louis and San Francisco Railway Company has applied for permission to construct a line of railway and telegraph through the southeasterly part of the Choctaw Nation:

And whereas the United States desires to obtain for the use and benefit of said company a right of way through said lands, with appurtenances thereto;

And whereas the Secretary of the Interior, with the sanction of the President of the United States, has designated Uri J. Baxter as an agent to present such application to the Choctaw Council, and he has duly presented the same;

And whereas the said council, upon the recommendation of the principal chief of said nation, has appointed Ellis Choate, Sampson Holson, Thomas H. Byington, J. P. Folsom, Alfred Wright, and J. W. Everidge on the part of said council to confer with said agent of the United States;

And whereas said parties have agreed to and duly submitted the following:

Now, therefore, be it enacted by the General Council of the Choctaw Nation assembled, That a right of way is hereby granted to the Saint Louis and San Francisco Railway Company, a corporation duly organized under the laws of the State of Missouri, for the construction of a railroad and telegraph line, said right of way to be two hundred feet in width at each station for a distance of four thousand feet in length; said right of way to commence at any point to be selected by said company on the line of said nation immediately contiguous to Sebastian or Scott counties, in the State of Arkansas, and run thence in a southwesterly direction on the most direct and practicable route through the said Choctaw Nation in the general direction of Paris, in the State of Texas; said road to continue to, or to connect with, a proposed road from the city of Paris aforesaid.

SEC. 2. The said Saint Louis and San Francisco Railway Company shall accept this right of way upon express condition, binding upon itself, its successors, and assigns that they will neither aid, advise, nor assist in any effort looking toward the changing or extinguishing the present tenure of the Choctaws in their lands, and will not attempt to secure from the Choctaw Nation any further grant or its occupancy than is hereinbefore provided.

SEC. 3. The said railway company shall pay for all property injured or destroyed by said company, and for all material taken and used in the construction, operation, or repairs of said road and telegraph line, and shall take no such material except under contract with the proper authorities of the Choctaw Nation, and according to the laws thereof: *Provided*, that before the construction of said railroad through any lands held by individual occupants according to the laws, customs, and usages of said nation, full compensation shall be made to such occupants for all property to be taken or damages to them by reason of the construction of the said road and telegraph line. In case of failure to make amicable settlements in any case, either national or individual, such compensation shall be determined by appraisement of three disinterested referees, one to be named by the Commissioner of Indian Affairs, one by the principal chief of said nation, and one by said company. This provision shall also apply to all cases of injury to persons and property occasioned by the construction or operation of said road and telegraph line, after the construction thereof shall have been commenced. Said arbitrators shall receive not exceeding four dollars per day for each, with mileage not exceeding six cents per mile, and witnesses shall receive the usual fees allowed by the courts of said nation. Costs shall be made a part of the award and be paid by the losing party.

In case of failure to pay such award, the Secretary of the Interior shall be, and is hereby, authorized to forbid the further passage of trains, or the use of said right of way, and to remove the agents and employés of said company from the limits of said nation as intruders, under the intercourse laws of the United States, until such time as payment shall be made by said company.

And, in addition to the foregoing, the injured parties shall have the right of recourse to all legal remedies that may be applicable in like cases in the judicial tribunals; and consent is hereby given that the civil jurisdiction of the district court of the United States for the western district of Arkansas, and such other courts as may be established by authority of the United States, shall be extended with the territory and limits of the Choctaw Nation, without distinction as to citizenship of the parties, so far as may be necessary for the enforcement of the provisions of this act.

SEC. 4. For and in consideration of the uses and grants aforesaid, the said railway company shall pay annually to the national treasurer of said nation, to be used for the benefit of schools therein, the sum of fifteen hundred dollars; and until the first of such payments be made, no right or power to enter upon said lands, except for the purpose of surveying and locating its line of road and telegraph, shall be acquired under the provisions of this act.

SEC. 5. Before any right shall accrue by virtue of this act, the same shall be ratified by the Congress of the United States; and within one year thereafter the said company shall file with the Secretary of the Interior a map showing the definite location of its line of road and telegraph, and shall complete the said road and telegraph through the lands of said nation within the further period of one year: *Provided*, That after the fixing of the general route by the filing of a map of preliminary survey in the office of the principal chief of said nation, who shall furnish a copy thereof to the Secretary of the Interior, no claim for a subsequent settlement and improvement shall be valid as against the said right of way.

SEC. 6. The said right of way shall not be settled upon by authority of said railway

company by non-citizens of said nation, except such employés of said company as are necessary to the successful operation of said railway and telegraph line and their families, and such persons as may be authorized by law to reside in the said nation: *Provided*, That only agents, operators, depot employés, and section-men shall be exempt, by reason of such employment, from payment of permits, as required of other non-citizens of said nation.

SEC. 7. No greater rates of fare or freight shall be charged in the Choctaw Nation by said railway company than the lowest rate authorized by law in the States of Arkansas and Texas, or either of them, for services or business of the same kind; and said railway company agree to convey all passengers, and to accept and transport all freight that may be offered, and to bill any freight which may be offered for shipment from points on said line in the Choctaw Nation to Chicago, with the privilege of stopping said freight at Saint Louis by the shipper, onthe same terms as if the bills had been made for Saint Louis in the first instance.

SEC. 8. The said railroad company shall execute a bond to the United States, to be filed with and approved by the Secretary of the Interior, in the penal sum of five hundred thousand dollars, for the use and benefit of the Choctaw Nation, to cover any and all damages which may accrue by reason of the failure of said railway company to comply with all or any of the provisions and conditions of this act. Said bond shall be good and valid against said company, its successors, and assigns, and shall be renewed at the expiration of every five years, and whenever in the judgment of the Secretary of the Interior a renewal of the same shall be deemed necessary for the protection of the interests of the Indians or of the United States.

SEC. 9. If within ninety days after the passage of this act by the Choctaw Council the company aforesaid shall fail to accept the conditions herein specified, by a resolution of its board of directors, certified to and filed with the Secretary of the Interior, as hereinbefore provided, then this act shall apply to any other incorporated company that shall have first obtained the approval of the President of the United States.

The within bill approved and adopted in special committee this second day of November, 1881.

URI J. BAXTER,
For the United States.
ELLIS CHOATE,
Chairman, on the part of the Choctaw Council.

[Telegram]

DEPARTMENT OF THE INTERIOR.
Washington, D. C., November 5, 1881.

U. J. BAXTER,
Caddo, Indian Territory:

Make no effort to influence decision of Choctaws as to right of way. Confine yourself to advice as to their legal and treaty rights, and to preparing documents that will fully protect both. Show this to governor, and give him copy.

S. J. KIRKWOOD.

EXECUTIVE OFFICE, CHOCTAW NATION,
November 10, 1881.

DEAR SIR: Herewith inclosed find certified copies of all papers necessary to explain the attitude of the right of way bill to the Saint Louis and San Francisco Railroad Company upon the records of the Choctaw Nation.

Very respectfully, your obedient servant,

J. F. McCURTAIN,
Principal Chief, Choctaw Nation.

Mr. U. J. BAXTER.
Special Agent United States, Washington City, D. C.

EXECUTIVE OFFICE, CHOCTAW NATION,
November 10, 1881.

SIR: In accordance with Sec. 2 of "An act defining the duties of the National Attorney," &c., approved Oct. 24, 1860, I have the honor to submit the following questions for your official opinion thereon:

1. Under Article, 3, section 9, of the Constitution, the House of Representatives de-

rived the power to make its rules, and accordingly made Rule 21st in reference to the vote of the speaker, which is as follows: "The speaker shall have a casting vote in case of a tie." Now does not this rule preclude the right of the speaker to vote, except in case of a tie?

2. If the speaker had been intended to have two votes should it not have been so specifically stated in said 21st rule or some other rule?

3. Is the speaker's endorsement on a bill that it "passed the House," and signed officially, necessary to its validity, or as notice to the principal chief of its passage?

4. Does the declaration of the speaker that a bill is defeated affect its validity?

Very respectfully, your obt. servt.,

J. F. McCURTAIN,
Principal Chief, Choctaw Nation.

Hon. C. S. VINSON,
National Attorney, Choctaw Nation.

I hereby certify that the foregoing transcript is a true and correct copy from the original.

In witness whereof I have have hereto set my hand and affix the seal of the Choctaw Nation. Done at Chahta Tomaha, this 10th November, A. D., 1881.

[SEAL.]

THOMPSON McKINNEY,
National Secretary, Choctaw Nation.

For St. Louis and San Francisco Railroad bill.

YEAS.	NAYS.
1. H. C. Harris.	1. Aaron Homma.
2. S. P. Nelson.	2. Elijer Brewer.
3. Kampelabe.	3. Joe. Wilson.
4. J. W. Everidge.	4. Alfred Wright.
5. Robert Benton.	5. J. P. Folsom.
6. C. C. Dukes.	6. Reuben Jackson.
7. T. D. Ainsworth.	7. Alpheus Crosbey.
8. S. W. Garvin.	8. Maurice Cass.
9. Jesse Zota.	9. B. F. Smallwood, speaker of the house.

The said bill having a tie vote, the speaker declares the bill defeated. On motion of Mr. Folsom & sec., the house adjourned, to meet at the signing of the bill. Carried.

I hereby certify that the above transcript is a true and correct copy from the original.

In witness whereof I have hereto set my hand and affixed the seal of the nation this 10th of November, A. D. 1881.

[SEAL.]

THOMPSON McKINNEY,
National Secretary, C. N.

Rule from by-laws of the house of representatives.

RULE 21ST. The speaker shall have a casting vote in case of a tie.

I hereby certify that the above transcript is a true and correct copy from the original.

In witness whereof I have hereto set my hand and affixed the seal of the Choctaw Nation this 10th November, A. D. 1881.

[SEAL.]

THOMPSON McKINNEY,
National Secretary, C. N.

OFFICE OF NATIONAL ATTORNEY, CHOCTAW NATION,
November 10, 1881.

Hon. J. F. McCURTAIN,
Principal Chief, Choctaw Nation:

SIR: Your communication of this date, propounding certain questions to me for my official opinion thereon, is at hand, and in answer to question first, I have to state that the constitution gives the two legislative bodies, the senate and house of representatives, the right to make such rules as they may see proper for the government of their own proceedings, and by virtue of Art. 3, sec. 9, of the constitution, *they*, after making and adopting such rules, under the oaths of their members to support the constitution; therefore, since Rule 21st of the by-laws of the house of representatives provides that "the speaker shall have a casting vote in case of a tie," it is clear that is all the vote

he is entitled to, or it would have been mentioned in that rule or in that connection; and since the said rule only gives the speaker a vote "in case of a tie," his vote, without it is in case of a tie, of course cannot be counted, and if he does assume to vote, except in case of a tie, his vote is clearly illegal. Further, the speaker being the presiding officer of the house, it is his duty to see that the rules are faithfully observed. It is a custom here in the Choctaw Nation in all bodies where they have a presiding officer that he votes only in case of a tie; the intention of this custom clearly being to save such bodies from a deadlock. It is contrary to the principles of popular government to place two votes in the hands of any one, and, besides, it is corrupting and dangerous power.

The second question is answered by the answer to the first.

In answer to the third question, I will state that the speaker's endorsement on a bill that is "passed the house" is not made necessary by law in any event.

In answer to the fourth question, I have to state that the validity of a bill is only affected by its failure to receive a majority of both houses of the general council, or the veto of the principal chief, and in the latter case by its failure to repass both houses of the general council by a two-thirds vote.

Very respectfully, your ob't servant,

C. S. VINSON,
National Attorney, Choctaw Nation.

I hereby certify that the foregoing transcript is a true and correct copy from the original.

In testimony whereof I have hereto set my hand and affixed the seal of the Choctaw Nation. Done at Chahta Tomaha this 10th day of November, 1881.

[SEAL.]

THOMPSON McKINNEY,
National Secretary, Choctaw Nation.

EXECUTIVE OFFICE, CHOCTAW NATION,
November 10, 1881.

SIR: I hand you herewith a certified copy of "A bill to grant a right of way through the Choctaw Nation to the Saint Louis and San Francisco Railway Company," which has passed both houses of the general assembly of the Choctaw Nation, and received my approval and become a law, as the result of your mission and consequent negotiations with the Choctaw Nation in behalf of said railway company.

I have the honor to thank you, and through you the President of the United States and the Secretary of the Interior, for the fairness and impartiality which you have been instructed to maintain, and have maintained throughout.

Very respectfully,

J. F. McCURTAIN,
Principal Chief, Choctaw Nation.

Mr. U. J. BAXTER,
Special Agent United States.

A BILL to grant a right of way through the Choctaw Nation to the St. Louis and San Francisco Railway Company.

Whereas the St. Louis and San Francisco Railway Company has applied for permission to construct a line of railway and telegraph through the southeasterly part of the Choctaw Nation;

And whereas the United States desire to obtain for the use and benefit of said company a right of way through said lands, with appurtenances thereto;

And whereas the Secretary of the Interior, with the sanction of the President of the United States, has designated Uri J. Baxter as an agent to present such application to the Choctaw Council, and he has duly presented the same;

And whereas the said council, upon the recommendation of the principal chief of said nation, has appointed Ellis Choate, Sampson Holson, Thomas H. Byington, J. P. Folsom, Alfred Wright, and J. W. Everidge, on the part of said council to confer with said agent of the United States;

And whereas said parties have agreed to and duly submitted the following:

Now, therefore, be it enacted by the general council of the Choctaw Nation assembled, That a right of way is hereby granted to the St. Louis and San Francisco Railway Company, a corporation duly organized under the laws of the State of Missouri, for the construction of a railroad and telegraph line, said right of way to be two hundred feet in width through the Choctaw Nation, and four hundred feet in width at each station for a distance of four thousand feet in length; said right of way to commence at any point selected by said company on the line of said nation immediately contiguous to Sebastian or Scott counties, in the State of Arkansas, and run

thence in a southwesterly direction on the most direct and practicable route through the said Choctaw Nation in the general direction of Paris, in the State of Texas; said road to continue to or to connect with a proposed road from the city of Paris aforesaid.

SEC. 2. The said St. Louis and San Francisco Railway Company shall accept this right of way upon express condition, binding upon itself, its successors and assigns, that they will neither, aid, advise, nor assist in any effort looking toward the changing or extinguishing the present tenure of the Choctaws in their lands, and will not attempt to secure from the Choctaw Nation any further grant of land or its occupancy than is hereinbefore provided.

SEC. 3. The said railway company shall pay for all property injured or destroyed by said company, and for all material taken and used in the construction, operation, or repairs of said road and telegraph line, and shall take no such material except under contract with the proper authorities of the Choctaw Nation, and according to the laws thereof: *Provided*, That before the construction of said road through any lands held by individual occupants according to the laws, customs, and usages of said nation, full compensation shall be made to such occupants for all property to be taken or damages to them by reason of the construction of the said road and telegraph line. In case of failure to make amicable settlements in any case, either national or individual, such compensation shall be determined by appraisement of three disinterested referees, one to be named by the Commissioner of Indian Affairs, one by the principal chief of said nation, and one by said company. This provision shall also apply to all cases of injury to persons or property occasioned by the construction or operation of said road and telegraph line, after the construction thereof shall have been commenced. Said arbitrators shall receive not exceeding four dollars per day for each, with mileage not exceeding six cents per mile, and witnesses shall receive the usual fees allowed by the courts of said nation. Costs shall be made a part of the award, and be paid by the losing party.

In case of failure to pay such award, the Secretary of the Interior shall be, and is hereby, authorized to forbid the further passage of trains or the use of said right of way, and to remove the agents and employés of said company from the limits of said nation as intruders, under the intercourse laws of the United States, until such time as payment shall be made by said company.

And, in addition to the foregoing, the injured parties shall have the right of recourse to all legal remedies that may be applicable in like cases in the judicial tribunals; and consent is hereby given that the civil jurisdiction of the district court of the United States for the western district of Arkansas, and such other courts as may be established by authority of the United States, shall be extended within the territory and limits of the Choctaw Nation, without distinction as to citizenship of the parties, so far as may be necessary for the enforcement of the provisions of this act.

SEC. 4. For and in consideration of the uses and grants aforesaid, the said railway company shall pay quarter-annually to the national treasurer of said nation, to be used for the benefit of schools therein, the sum of five hundred dollars; and until the first of such payments be made, no right or power to enter upon said lands, except for the purpose of surveying and locating its line of road and telegraph, shall be acquired under the provisions of this act.

SEC. 5. Before any right shall accrue by virtue of this act the same shall be ratified by the Congress of the United States; and within one year thereafter, the said company shall file with the Secretary of the Interior a map showing the definite location of its line of road and telegraph, and shall complete the said road and telegraph through the lands of said nation within the further period of one year: *Provided*, That after the fixing of the general route by the filing of a map of preliminary survey in the office of the principal chief of said nation, who shall furnish a copy thereof to the Secretary of the Interior, no claim for a subsequent settlement and improvement shall be valid as against the said right of way.

SEC. 6. The said right of way shall not be settled upon by authority of said railway company, by non-citizens of said nation, except such employés of said company as are necessary to the successful operation of said railway and telegraph line, and their families, and such persons as may be authorized by law to reside in said nation: *Provided*, That only agents, operators, depot employés, and section men shall be exempt by reason of such employment from payment of permits, as required of other non-citizens of said nation.

SEC. 7. No greater rates of fare or freight shall be charged in the Choctaw Nation, by said railway company, than the lowest rate authorized by law in the States of Arkansas and Texas, or either of them, for services or business of the same kind; and said railway company agree to convey all passengers and to accept and transport all freight that may be offered, and to bill any freight that may be offered for shipment from points on said line in the Choctaw Nation to Chicago with the privilege of stopping said freight at St. Louis, by the shipper, on the same terms as if the bills had been made for St. Louis in the first instance.

SEC. 8. The said railroad company shall execute a bond to the United States, to be filed with and approved by the Secretary of the Interior, in the penal sum of five hundred thousand dollars, for the use and benefit of the Choctaw Nation, to cover any and all damages which may accrue by reason of the failure of said railway company to comply with any or all of the provisions and conditions of this act; said bond shall be good and valid against said company, its successors and assigns, and shall be renewed at the expiration of every five years, and whenever in the judgment of the Secretary of the Interior a renewal of the same shall be deemed necessary for the protection of the interests of the Indians or of the United States.

SEC. 9. If within ninety days after the passage of this act by the Choctaw council the company aforesaid shall fail to accept the conditions herein specified, by a resolution of its board of directors, certified to and filed with the Secretary of the Interior, or shall fail within one year to file its map of location with the Secretary of the Interior as hereinbefore provided, then this act shall apply to any other incorporated company that shall have first obtained the approval of the President of the United States.

Approved Nov. 10, 1881.

J. F. McCURTAIN,
Principal Chief Choctaw Nation.

I hereby certify that the foregoing transcript is a true and correct copy from the original bill now on file in my office.

In witness whereof I have hereunto set my hand and affixed the seal of the Choctaw Nation. This done at Chahta Tomaha, November 10, 1881.

[GREAT SEAL OF THE CHOCTAW NATION.]

THOMPSON McKINNEY,
National Secretary Choctaw Nation.

DEPARTMENT OF THE INTERIOR,
Washington, November 30, 1881.

SIR: Referring to my reports of October 20, 21, and 24, I have the honor to submit the following as the result of my negotiations with the authorities of the Choctaw Nation respecting the grant of a right of way for railroad purposes through the lands of said tribe in the Indian Territory.

Having received your instructions of October 21, 1881, directing me to lay before the said authorities the application of the Saint Louis and San Francisco Railway Company, to be considered by them in connection with the application of the Chicago, Texas and Mexican Central Railway Company, already presented under your instructions of the 10th October, as detailed in former report, I left Saint Louis on the evening of the 24th and reached the Choctaw seat of government on the morning of the 26th of October.

Mr. L. H. Fitzhugh accompanied me as a representative of the Chicago, Texas and Mexican Central Company. I had while in Saint Louis conferred with C. W. Rogers, general manager of the Saint Louis and San Francisco Company, and received advice to the effect that Mr. W. P. Paxson would meet me at the council as the representative of the latter company.

At Caddo Station we received a telegram from the officers of the former company at Chicago, bearing date the 25th of October, advising us that the latter had agreed with them in relation to their rights, and instructing Mr. Fitzhugh to withdraw their bill and give all possible aid to pass that of the Saint Louis and San Francisco Company. This left no further duty for me except to present the application of the Saint Louis and San Francisco Railway Company, which I laid before the principal chief, with my new instructions, on the morning of my arrival.

Upon his invitation I met the members of the council and the principal men of the nation in the evening, and again presented my instructions, which were fully interpreted to the Indians. The conference lasted until a late hour. Many questions were asked touching the existing laws and treaty obligations, the general status of their tribe with respect to the government and the condition of particular matters now pending in the Interior Department; to all of which I gave such answer as my means of information would allow.

On the following morning, October 27, the principal chief submitted a special message to the council, with a copy of the papers presented by me, strongly recommending favorable action upon the application, and requested a special committee of three from each house be appointed to confer with me and formulate a bill granting the right of way as applied for. The request was acceded to, and there were appointed on the part of the Senate, Samson Holson, Ellis Choate, and T. M. Byington; and on the part of the House, Alfred Wright, J. P. Folsom, and J. W. Everidge. Several days were spent by this committee in considering the question; and, on Wednesday,

Nov. 2, after full discussion and deliberation, a vote was taken upon the form of a bill and report to be submitted to the council, which resulted in its favor, by the vote of four members of the committee, one being absent and one declining to vote.

The report was signed by myself on the part of the United States, and Messrs. Choate, Byington, Holson, and Everidge on the part of the Choctaw Nation; and was on the following day duly presented to the Senate, in accordance with the rules of the council, by Mr. Choate, chairman of the committee. Having been read and discussed for three successive days, according to the rule in force, it passed the Senate on Saturday, November 5, with a single amendment providing for quarter-annual payments of five hundred dollars each, instead of annual payments of fifteen hundred dollars, recommended by the committee as compensation for the use of the granted right of way.

In the House the bill came to a final vote on Wednesday and received nine votes in its favor to eight against it. The Speaker added his vote in the negative, producing a tie, and declared it defeated. On the following day the national secretary laid the bill before the principal chief, with the record of the vote, and there being a question whether, under the national constitution and the by-laws of the council, the same had not actually received a legal majority so as to authorize his approval of the bill, Principal Chief McCurtain submitted the same to the national attorney for an authoritative opinion upon the subject.

The rules of the House provide as follows: "The Speaker shall have a casting vote in case of a tie."

The national attorney gave his opinion that this provided for the only case in which the Speaker could vote upon a pending measure, and stated that the custom of all bodies having a presiding officer in the Choctaw Nation excludes his vote except in case of a tie. He therefore advised that the measure be considered as passed by the House and in a condition for Executive approval, whereupon it was regularly approved by the principal chief and placed on the files of the national secretary on the 10th of November, 1881.

The principal chief on the same day inclosed to me a certified copy of the approved bill to be presented to you with this report as the result of my mission and negotiations with his people, and I immediately took leave and started on my return.

I have to add for your information, and by way of recital, that on the evening of the 27th of October, upon invitation of the principal chief, I laid fully before a public meeting of the Choctaws the provisions of the bill, and answered, to the best of my ability, the many questions propounded.

Great and growing interest was manifested from the beginning; and the proper sentiment among the Indians was generally and earnestly in favor of the grant. A few in the council (which consists of eighteen members in the House and twelve Senators) opposed it. Among them was the Speaker, who stated that he was not altogether antagonistic to such a measure, but desired to see the jurisdiction of the Choctaw courts extended to cover possible litigation before admitting any more railroads into the country. I found various parties on the ground, coming and going between the council and the railroad station at Caddo, some of whom were whites and some citizens of other Indian nations, and who seemed to have no special business with the principal chief or the council. Some of these were friends of the pending bill, from the city of Paris in Texas, and others seemed to be using their influence to persuade the Indians to antagonize the measure. Once or twice there seemed to be danger of excitement in consequence of indulgence in intoxicating liquors, secretly procured. Rumors were also started to the effect that undue influence was being used by white men to control the votes of members of the council, and I deemed it proper to ask the presence of Colonel Tufts, the Indian agent, and accordingly telegraphed him. He reported on Thursday, November 3, and remained till Saturday; again returning on Monday and remaining till my final departure.

Upon his arrival a number of these visitors left; and upon request of the principal chief the agent quietly advised all who were not properly recognized by the government or the Indians to withdraw from the immediate vicinity of the council, leaving them to decide for themselves without embarrassment the question before them. The suggestion was heeded, and Mr. Paxson alone remained as the representative of the railroad company, pending the consideration of the bill by the House.

Acting within the spirit of your telegraphic instructions of the 5th of November, I took no active part in urging its passage. When questions were presented bearing upon the matter I gave reply as fully and fairly as I was able; stating the general fact that the desire of the department to procure a right of way was sufficiently manifested in sending me to confer with the Choctaw people on the subject; that having presented those instructions I was expected to leave the whole matter to their free choice and judgment, and that I had asked and should ask no member of the council to vote for the bill.

On the morning of the final vote the speaker of the house desired written answers to certain questions propounded by him, in order, as he said, to satisfy certain mem-

bers who feared that a menace was intended in case of refusal to grant the right of way. These, with the answers, are as follows:

"Question. Is it the United States or a railroad company that wants this right of way?

"Answer. A railroad company. The instructions of the President and honorable Secretary of the Interior are to negotiate an agreement for a right of way for the use and benefit of the railroad company. Having presented it, it is the instruction that no effort be made on the part of the agent of the United States to influence the action of the Choctaw council.

"Question. In case the council fail to grant the right of way, will it be violating any treaty or law that we have with the Government of the United States?

"Answer. It will not.

"Question. Will we still have the same protection from the United States that we have enjoyed heretofore?

"Answer. So far as the laws and treaties are concerned you will."

On the evening of the 4th of November Senator Maxey, of Texas, by invitation of the principal chief, addressed the Indians in advocacy of the bill, urging with much force the desire of their friends in the United States to see them take advanced ground respecting public interests, and thus show to the country their intelligent progress in civilization.

These are the principal details of my negotiations and observations. I inclose as exhibits copies of my instructions and such papers as are necessary to set forth all the matters covered by this report, together with a copy of the bill as finally approved, and the letter of the principal chief transmitting the same.

The result seems to give general satisfaction among the Choctaws, both principal men and citizens, so far as my means of observation enabled me to judge.

The right of way granted is 200 feet in width across the lands of the nation in the direction furnished for its route, with an additional 200 feet at all stations for a distance of 4,000 feet in length.

It is estimated that the entire length will be about 125 miles, for which the company will pay $500 quarter-annually, amounting to $2,000 per year, perpetually, to be applied for school purposes by said nation.

The interests of the Indians are sought to be protected by stringent and clear provisions, and their rights are specifically defined in the act.

I have to add, incidentally, that while I was not specifically advised as to the terms of agreement between the two railway companies, my understanding, derived from general remark, was that they were to connect at Red River, on the Choctaw boundary, each bearing half the expense of bridging the stream, with rental for uses of the bridge, to be hereafter fixed by further agreement.

The agents of the respective railway companies, who accompanied me, and appeared before the Choctaw authorities in behalf of the grant, were, I have every reason to believe, perfectly fair and honorable in all their intercourse with the Indians, and seemed to be especially solicitous that every reasonable guarantee for their protection should be provided in the bill. The same solicitude was also expressed by the officers of the companies in the preliminary conferences had with myself at Chicago and Saint Louis; and I am satisfied that they have throughout acted in the most perfect good faith toward the Choctaw people and the Government of the United States.

In conclusion I have to thank you for the confidence reposed in me, and beg to be permitted to express the hope that you may approve of the manner in which my duties under your instructions have been discharged.

I have the honor to be, very respectfully, your obedient servant,

U. J. BAXTER,
Special Agent.

Hon. S. J. KIRKWOOD,
Secretary of the Interior.

Schedule of papers accompanying report of U. J. Baxter, special agent, dated November 30, 1881, respecting the negotiation of an agreement for a right of way for railroad purposes across the lands of the Choctaw Nation.

1. Copy of application, dated September 30, 1881, of the Chicago, Texas and Mexican Central Railway Company.
2. Copy of letter of Secretary of the Interior to the President, dated October 6, 1881, recommending appointment of an agent, with Executive indorsement of October 8, 1881, concurring in the same.
3. Instructions from the Secretary, dated October 10, 1881.

4. Copy of application, dated October 18, 1881, by the president of the Saint Louis and San Francisco Railway Company, with further application by treasurer of said company, dated October 20, 1881.
5. Copy of recommendation to the President, dated October 20, 1881, with Executive indorsement of October 21, 1881.
6. Instructions from Secretary, dated October 21, 1881.
7. Telegraphic instructions of October 24, 1881.
8. Telegraphic authority from D. K. Tripp and others, dated October 25, 1881, to withdraw application of the Chicago, Texas and Mexican Central Railway Company.
9. Telegraphic instructions of November 5, 1881.
10. Certified copy of message of principal chief, dated October 27, 1881.
11. Certificates from house and senate journals, showing the appointment of committee.
12. Duplicate of report and bill as agreed upon by committee, November 2, 1881.
13. Certified copy of bill as approved November 10, 1881, with letter of principal chief transmitting the same.
14. Letter of principal chief, of November 10, 1881, inclosing certified copies of papers relating to approval of bill.

DEPARTMENT OF THE INTERIOR,
Washington, December 1, 1881.

SIR: I learn that you were present a portion of the time during which negotiations were pending before the Choctaw council for right of way to Saint Louis and San Francisco Railway Company through the Choctaw Reservation.

Please send me at your earliest convenience the result of your observations bearing upon the questions—

1. Whether the negotiations between the Indian council and the railroad people were fairly and properly conducted;
2. Whether the action taken by the council meets the approbation of the Choctaws generally.

I desire an immediate reply.

Very respectfully,

S. J. KIRKWOOD,
Secretary.

Indian Agent TUFTS,
Union Agency, Indian Territory.

UNITED STATES INDIAN SERVICE, UNION AGENCY,
Muscogee, Ind. Ter., December 6, 1881.

SIR: I have the honor to acknowledge the receipt of your letter of the 1st instant, directing me to report—

1st. Whether the negotiations between the railroad people and the Indian council were fairly and properly conducted; and

2d. Whether the action by the council meets the approbation of the Choctaws generally.

In reply I have to state that, at the request of Mr. Baxter, of the Interior Dopartment, I was with him at the Choctaw council while the act granting right of way to the Saint Louis and San Francisco Railroad Company was under consideration.

The question of granting this right of way was before the council last year, and entered into the election of members of the council and national officers, at the election in August last—so that the Choctaw people were well posted as to what was wanted.

As so much had been said about the methods used to obtain the consent of Indian councils, I arranged things so that no improper means could be used either for or against the act without my knowledge.

Mr. Baxter exhibited his instructions from the department, so that all should know just what his business was; and I saw nothing in his conduct, or heard nothing in his informations and opinions given to the Indians, in which he exceeded his instructions in any manner. The council fully understood the position of the department.

I am certainly of the opinion that the negotiations were fairly and properly conducted.

Referring to the second question, I believe that a majority of the Choctaw people were in favor of granting the right of way before the council met, and that now those who opposed, so far as I can learn, knowing the act has become a law of the nation,

expect the road to be built. I believe the action of the council meets the approbation of Choctaws generally.

Very respectfully,

JOHN Q. TUFTS,
United States Indian Agent.

Hon. S. J. KIRKWOOD,
Secretary of the Interior, Washington, D. C.

SAINT LOUIS AND SAN FRANCISCO RAILWAY COMPANY,
New York, December 6, 1881.

DEAR SIR: At a meeting of the board of directors of this company, held this day, the bill of the legislature of the Choctaw Nation, granting right of way for the road of this company through the lands of that nation, was duly accepted, with the conditions therein specified and a certified copy of the action taken in the premises is herewith sent you to be filed in your office, all being in accordance with the terms of section 9 of said bill.

Very respectfully, your obedient servant,

E. F. WINSLOW,
President.

HON. SAMUEL J. KIRKWOOD,
Secretary of the Interior, Washington, D. C.

SAINT LOUIS AND SAN FRANCISCO RAILWAY COMPANY,
New York, December 6, 1881.

This is to certify that at a meeting of the board of directors of this company, held this 6th day of December, 1881, a quorum being present, the following resolution was unanimously adopted as appears by the records:

"*Resolved* That this company for itself, its successors and assigns hereby accepts the bill passed by the legislature or council of the Choctaw Nation in the Indian Territory, approved Nov. 10, 1881, granting the right of way, to this company, through the lands of that nation, together with all the terms and conditions of the same, and that the president and secretary execute a copy of this resolution, with the seal of the company affixed thereto and transmit the same to the Secretary of the Interior at Washington, to be filed in his office."

A true copy from the records.
[SEAL.]

C. LITTLEFIELD,
Secretary.

47TH CONGRESS, 1st Session. } SENATE. { EX. DOC. No. 16.

MESSAGE

FROM THE

PRESIDENT OF THE UNITED STATES,

TRANSMITTING,

In response to Senate resolution of December 12, 1881, *a report from the Secretary of State, touching the proposed modification of the Clayton-Bulwer Treaty of April* 19, 1850, *between the United States and Great Britain.*

DECEMBER 15, 1881.—Read, and referred to the Committee on Foreign Relations and ordered to be printed.

To the Senate of the United States:

I transmit herewith, in response to a resolution of the Senate of the 12th instant, a report from the Secretary of State, with an accompanying paper, touching the proposed modification of the Clayton-Bulwer Treaty of April 19, 1850, between the United States and Great Britain.

CHESTER A. ARTHUR.

EXECUTIVE MANSION,
December 15, 1881.

To the PRESIDENT:

The Secretary of State, to whom was referred the Senate resolution of December 12, 1881, requesting the President to "communicate to the Senate, if in his opinion not incompatible with the public interest, the instructions sent to our minister in London in regard to the modification of the Clayton-Bulwer Treaty," has the honor, in response thereto, to lay before the President the accompanying copy of an instruction sent on the 19th ultimo to the United States minister at London.

In further reference to the subject-matter of the aforesaid resolution of the Senate, the Secretary of State has the honor to observe that, after the instruction of the 19th ultimo was mailed, but before it was communicated to the British Government, a note was received from that government on the same subject, to which an immediate reply was made, which is now on its way to London. Both the note of Lord Granville and the reply of the Secretary of State thereto can be communicated to the Senate when that reply shall have been made known to the Government of Great Britain.

Respectfully submitted.

JAMES G. BLAINE.

DEPARTMENT OF STATE,
Washington, December 15, 1881.

No. 270.] DEPARTMENT OF STATE,
Washington, November 19, 1881.

JAMES RUSSELL LOWELL, Esq.,
&c., &c., &c., London:

SIR: In pursuance of the premises laid down in my circular note of June 24 of this year touching the determination of this government with respect to the guarantee of neutrality for the interoceanic canal at Panama, it becomes my duty to call your attention to the convention of April 19, 1850, between Great Britain and the United States, commonly known as the Clayton-Bulwer Treaty.

According to the articles of that convention the high contracting parties in referring to an interoceanic canal through Nicaragua agreed "that neither the one nor the other will ever obtain or maintain for itself any exclusive control over said ship-canal, and that neither will ever erect or maintain any fortifications commanding the same or in the vicinity thereof." In a concluding paragraph the high contracting parties agreed "to extend their protection by treaty stipulations to any other practical communications, whether by canal or railway, across the isthmus * * * which are now proposed to be established by way of Tehuantepec or Panama."

This convention was made more than thirty years ago under exceptional and extraordinary conditions which have long since ceased to exist—conditions which at best were temporary in their nature, and which can never be reproduced.

The remarkable development of the United States on the Pacific coast since that time has created new duties for this government, and devolved new responsibilities upon it, the full and complete discharge of which requires in the judgment of the President some essential modifications in the Clayton-Bulwer Treaty. The interests of Her Majesty's Government involved in this question, in so far as they may be properly judged by the observation of a friendly power, are so inconsiderable in comparison with those of the United States that the President hopes a readjustment of the terms of the treaty may be reached in a spirit of amity and concord.

The respect due to Her Majesty's Government demands that the objections to the perpetuity of the convention of 1850, as it now exists, should be stated with directness and with entire frankness. And among the most salient and palpable of these is the fact that the operation of the treaty practically concedes to Great Britain the control of whatever canal may be constructed.

The insular position of the home government, with its extended colonial possessions, requires the British Empire to maintain a vast naval establishment, which, in our continental solidity, we do not need, and in time of peace shall never create. If the United States binds itself not to fortify on land, it concedes that Great Britain, in the possible case of a struggle for the control of the canal, shall, at the outset, have an advantage which would prove decisive, and which could not be reversed except by the expenditure of treasure and force. The presumptive intention of the treaty was to place the two powers on a plane of perfect equality, with respect to the canal, but in practice, as I have indicated, this would prove utterly delusive, and would instead surrender it, if not in form, yet in effect, to the control of Great Britain.

The treaty binds the United States not to use its military force in any precautionary measure, while it leaves the naval power of Great Britain perfectly free and unrestrained; ready at any moment of need to seize

both ends of the canal, and render its military occupation on land a matter entirely within the discretion of Her Majesty's Government.

The military power of the United States, as shown by the recent civil war, is without limit, and in any conflict on the American continent altogether irresistible. The Clayton-Bulwer Treaty commands this government not to use a single regiment of troops to protect its interests in connection with the interoceanic canal, but to surrender the transit to the guardianship and control of the British navy. If no American soldier is to be quartered on the Isthmus to protect the rights of his country in the interoceanic canal, surely, by the fair logic of neutrality, no war vessel of Great Britian should be permitted to appear in the waters that control either entrance to the canal.

A more comprehensive objection to the treaty is urged by this government. Its provisions embody a misconception of the relative positions of Great Britain and the United States with respect to the interests of each government in questions pertaining to this continent. The Government of the United States has no occasion to disavow an aggressive disposition. Its entire policy establishes its pacific character, and among its chief aims is to cultivate the most friendly and intimate relations with its neighbors, both independent and colonial. At the same time, this government, with respect to European states, will not consent to perpetuate any treaty that impeaches our right and long-established claim to priority on the American continent.

The United States seeks only to use for the defense of its own interests the same forecast and provision which Her Majesty's government so emphatically employs in defense of the interests of the British Empire. To guard her Eastern possessions, to secure the most rapid transit for troops and munitions of war, and to prevent any other nation having equal facilities in the same direction, Great Britain holds and fortifies all the strategic points that control the route to India. At Gibraltar, at Malta, at Cyprus, her fortifications give her the mastery of the Mediterranean. She holds a controlling interest in the Suez Canal, and by her fortifications at Aden and on the island of Perim she excludes all other powers from the waters of the Red Sea, and renders it a *mare clausum*. It would, in the judgment of the President, be no more unreasonable for the United States to demand a share in these fortifications, or to demand their absolute neutralization, than for England to make the same demand in perpetuity from the United States with respect to the transit across the American continent. The possessions which Great Britain thus carefully guards in the East are not of more importance to her than is the Pacific slope, with its present development and assured growth, to the Government of the United States.

The States and Territories appurtenant to the Pacific Ocean and dependent upon it for commercial outlet, and hence directly interested in the canal, comprise an area of nearly eight hundred thousand square miles, larger in extent than the German Empire and the four Latin countries of Europe combined.

This vast region is but fairly beginning its prosperous development. Six-thousand miles of railway are already constructed within its limits, and it is a moderate calculation to say, that within the current decade the number of miles will at least be doubled. In the near future the money value of its surplus for export will be as large as that of British India, and perhaps larger. Nor must it be forgotten that India is but a distant colony of Great Britain, while the region on the Pacific is an integral portion of our national union, and is of the very form and body of our state. The inhabitants of India are alien from England in

race, language, and religion. The citizens of California, Oregon, and Nevada, with the adjacent Territories, are of our own blood and kindred—*bone of our bone* and *flesh of our flesh*.

Great Britain appreciates the advantage and perhaps the necessity of maintaining, at the cost of large military and naval establishments, the interior and nearest route to India, while any nation with hostile intent is compelled to take the longer route and travel many thousand additional miles through dangerous seas. It is hardly conceivable that the same great power which considers herself justified in taking these precautions for the safety of a remote colony on another continent should object to the United States adopting similar but far less demonstrative measures for the protection of the distant shores of her own domain, for the drawing together of the extremes of the union in still closer bonds of interest and sympathy, and for holding, in the quiet determination of an honorable self-defense, the absolute control of the great waterway which shall unite the two oceans and which the United States will always insist upon treating as part of her coast line.

If a hostile movement should at any time be made against the Pacific coast, threatening danger to its people and destruction to its property, the Government of the United States would feel that it had been unfaithful to its duty and neglectful towards its own citizens if it permitted itself to be bound by a treaty which gave the same right through the canal to a war-ship bent on an errand of destruction that is reserved to its own navy, sailing for the defense of our coast and the protection of the lives of our people. And as England insists by the might of her power that her enemies in war shall strike her Indian possessions only by doubling the Cape of Good Hope, so the Government of the United States will equally insist that the interior, more speedy and safer route of the canal shall be reserved for ourselves, while our enemies, if we shall ever be so unfortunate as to have any, shall be remanded to the voyage around Cape Horn.

A consideration of controlling influence in this question is the well-settled conviction on the part of this government that only by the United States exercising supervision can the Isthmus canals be definitely and at all times secured against the interference and obstruction incident to war. A mere agreement of neutrality on paper between the great powers of Europe might prove ineffectual to preserve the canal in time of hostilities. The first sound of a cannon in a general European war would in all probability annul the treaty of neutrality, and the strategic position of the canal, commanding both oceans, might be held by the first naval power that could seize it. If this should be done the United States would suffer such grave inconvenience and loss in her domestic commerce as would inforce the duty of a defensive and protective war on her part for the mere purpose of gaining that control which in advance she insists is due to her position and demanded by her necessities.

I am not arguing or assuming that a general war, or any war at all, is imminent in Europe. But it must not be forgotten that within the past twenty-five years all the great powers of Europe have been engaged in war; most of them more than once. In only a single instance in the past hundred years has the United States exchanged a hostile shot with any European power. It is in the highest degree improbable that for a hundred years to come even that experience will be repeated.

It consequently becomes evident that the one conclusive mode of preserving any Isthmus canal from the possible distraction and destruction of war is to place it under the control of that government least

likely to be engaged in war, and able, in any and in every event, to enforce the guardianship which she will assume.

For self-protection to her own interests, therefore, the United States in the first instance asserts her right to control the Isthmus transit. And, secondly, she offers by such control that absolute neutralization of the canal, as respects European powers, which can in no other way be certainly attained and lastingly assured.

Another consideration forcibly suggests the necessity of modifying the convention under discussion. At the time it was agreed to Great Britain and the United States were the only nations prominent in the commerce of Central and South America. Since that time other leading nations have greatly enlarged their commercial connections with that country, and are to-day contending for supremacy in the trade of those shores. Within the past four years, indeed, the number of French and German vessels landing on the two coasts of Central America far exceeds the number of British vessels.

While, therefore, Great Britain and the United States may agree to do nothing, and, according to the present convention, each remains bound to the other in common helplessness, a third power, or a fourth, or a combination of many, may step in and give direction to the project which the Clayton-Bulwer Treaty assumed was under the sole control of the two English-speaking nations. Indeed, so far as the canal scheme now projected at Panama finds a national sponsor or patron, it is in the Republic of France, and the non-intervention enjoined upon this country by the Clayton-Bulwer Treaty, if applied to that canal, would paralyze the arm of the United States in any attempt to assert the plain rights and privileges which this government acquired through a solemn treaty with the Republic of Colombia anterior to the Clayton-Bulwer Convention, so that the modification of the Treaty of 1850, now sought, is not only to free the United States from unequal and inequitable obligations to Great Britain, but, also, to empower this government to treat with all other nations seeking a foothold on the Isthmus on the same basis of impartial justice and independence.

One of the motives that originally induced this government to assent to the Clayton-Bulwer Treaty, not distinctly expressed in the instrument but inferable from every line of it, was the expected aid of British capital in the construction of the Nicaraguan Canal. That expectation has not been realized, and the changed condition of this country since 1850 has diminished, if it has not entirely removed from consideration, any advantage to be derived from that source. Whenever in the judgment of the United States government the time shall be auspicious and the conditions favorable for the construction of the Nicaraguan Canal, no aid will be needed outside of the resources of our own government and people; and while foreign capital will always be welcomed and never repelled, it cannot henceforth enter as an essential factor in the determination of this problem.

It is earnestly hoped by the President that the considerations now presented will have due weight and influence with Her Majesty's government and that the modifications of the treaty desired by the United States will be conceded in the same friendly spirit in which they are asked. The following is a summary of the changes necessary to meet the views of this government.

First. Every part of the treaty which forbids the United States fortifying the canal and holding the political control of it in conjunction with the country in which it is located, to be cancelled.

Second. Every part of the treaty in which Great Britain and the

United States agree to make no acquisition of territory in Central America, to remain in full force. As an original proposition, this government would not admit that Great Britain and the United States should be put on the same basis even negatively, with respect to territorial acquisitions on the American continent and would be unwilling to establish such a precedent without full explanation. But the treaty contains that provision with respect to Central America, and if the United States should seek its annulment, it might give rise to erroneous and mischievous apprehensions among a people with whom this government desires to be on the most friendly terms. The United States has taken special occasion to assure the Spanish American Republics to the south of us that we do not intend and do not desire to cross their borders or in any way disturb their territorial integrity, and we shall not willingly incur the risk of a misunderstanding by annulling the clauses in the Clayton-Bulwer Treaty which forbid such a step with Central America. The acquisition of military and naval stations necessary for the protection of the canal and voluntarily ceded to the United States by the Central American States, not to be regarded as a violation of the provisions contained in the foregoing.

Third. The United States will not object to maintaining the clause looking to the establishment of a free port at each end of whatever canal may be constructed if England desires it to be retained.

Fourth. The clause in which the two governments agreed to make treaty stipulations for a joint protectorate of whatever railway or canal might be constructed at Tehuantepec or Panama has never been perfected. No treaty stipulations for the proposed end have been suggested by either party, although citizens of the United States long since constructed a railway at Panama, and are now engaged in the same work at Tehauntepec. It is a fair presumption, in the judgment of the President, that this provision should be regarded as absolute by the non-action and common consent of the two governments.

Fifth. The clause defining the distance from either end of the canal where in time of war captures might be made by either belligerent on the high seas was left incomplete, and the distance was never determined. In the judgment of the President, speaking in the interest of peaceful commerce, this distance should be made as liberal as possible and might, with advantage, as a question relating to the high seas and common to all nations, be a matter of stipulation between the great powers of the world.

In assuming as a necessity the political control of whatever canal or canals may be constructed across the Isthmus, the United States will act in entire harmony with the governments within whose territory the canals shall be located. Between the United States and the other American republics there can be no hostility, no jealousy, no rivalry, no distrust. This government entertains no design in connection with this project for its own advantage which is not also for the equal or greater advantage of the country to be directly and immediately affected. Nor does the United States seek any exclusive or narrow commercial advantage. It frankly agrees and will by public proclamation declare at the proper time, in conjunction with the republic on whose soil the canal may be located, that the same rights and privileges, the same tolls and obligations for the use of the canal, shall apply with absolute impartiality to the merchant marine of every nation on the globe. And equally in time of peace, the harmless use of the canal shall be freely granted to the war vessels of other nations. In time of war, aside from the defensive use to be made of it by the country in which it is con-

structed and by the United States, the canal shall be impartially closed against the war vessels of all belligerents.

It is the desire and determination of the United States that the canal shall be used only for the development and increase of peaceful commerce among all the nations, and shall not be considered a strategic point in warfare which may tempt the aggressions of belligerents or be seized under the compulsions of military necessity by any of the great powers that may have contests in which the United States has no stake and will take no part.

If it be asked why the United States objects to the assent of European governments to the terms of neutrality for the operation of the canal, my answer is that the right to assent implies the right to dissent, and thus the whole question would be thrown open for contention as an international issue. It is the fixed purpose of the United States to confine it strictly and solely as an American question, to be dealt with and decided by the American government.

In presenting the views contained herein to Lord Granville, you will take occasion to say that the government of the United States seeks this particular time for the discussion as most opportune and auspicious. At no period since the peace of 1783 have the relations between the British and American governments been so cordial and friendly as now. And I am sure Her Majesty's government will find in the views now suggested and the propositions now submitted, additional evidence of the desire of this government to remove all possible grounds of controversy between two nations which have so many interests in common, and so many reasons for honorable and lasting peace.

You will at the earliest opportunity acquaint Lord Granville with the purpose of the United States touching the Clayton-Bulwer Treaty, and in your own way, you will impress him fully with the views of your government.

I refrain from directing that a copy of this instruction be left with his lordship, because in reviewing the case I have necessarily been compelled, in drawing illustrations from British policy, to indulge somewhat freely in the *argumentum ad hominem*.

This course of reasoning in an instruction to our own minister is altogether legitimate and pertinent, and yet might seem discourteous if addressed directly to the British Government. You may deem it expedient to make this explanation to Lord Granville, and, if afterwards, he shall desire a copy of this instruction, you will of course furnish it.

I am, &c., &c.,

JAMES G. BLAINE.

47TH CONGRESS, 1st Session. } SENATE. { EX. DOC. No. 17.

LETTER

FROM

THE SECRETARY OF THE NAVY,

TRANSMITTING,

In compliance with Senate resolution of May 19, 1881, *a list giving the names of clerks and other employés in that department not required to be confirmed by the Senate, &c.*

DECEMBER 16, 1881.—Ordered to lie on the table and be printed.

NAVY DEPARTMENT,
Washington, December 15, 1881.

SIR: I have the honor to transmit herewith a statement giving the names of the clerks and other employés in this department, with other information regarding them, in compliance with the following resolution of the Senate, passed May 19, 1881, viz:

Resolved, That the Secretaries of State, Treasury, Interior, War, Navy, the Postmaster-General, and the Attorney-General, be directed to transmit to the Senate the names of all officers, clerks, and other employés borne upon their rolls, respectively, not required to be confirmed by the Senate, and the salary paid to each, together with the date of their appointment, the State to which each is charged, the grade of office held, the compensation received, and whether each of said officers, clerks, or employés is white or colored, and which of such clerks or employés served in the regular or volunteer service of the United States during the war of the rebellion.

I have the honor to be, very respectfully,

WILLIAM H. HUNT,
Secretary of the Navy.

Hon. DAVID DAVIS,
President pro tempore United States Senate, Washington, D. C.

List of clerks and other employés in the Navy Department.

Name.	Grade of office.	State to which each is charged.	Date of appointment.	White or colored.	In regular or volunteer service of United States during war of rebellion.	Compensation.
SECRETARY'S OFFICE.						
John W. Hogg	Chief clerk	Tennessee	Jan. 1, 1854	White	No; was exempt	$2,500 00
F. H. Stickney	Disbursing clerk	Maine	May 29, 1861	do	No	2,000 00
William P. Moran	Fourth-class clerk	Virginia	Oct. 28, 1843	do	No; was exempt	1,800 00
W. S. McNairy	do	Tennessee	May 23, 1852	do	do	1,800 00
Jesse E. Dow	do	District of Columbia	Nov. 27, 1862	do	No	1,800 00
H. S. Bowen	do	Maryland	June 6, 1862	do	No	1,800 00
Benjamin W. Hanna	Stenographer	Kansas	Apr. 16, 1881	do	No	1,600 00
J. E. Potts	Third-class clerk	New Jersey	May 1, 1874	do	Volunteer Army	1,600 00
Wythe Denby	do	Kentucky	Apr. —, 1853	do	No	1,600 00
R. T. Cheyney	do	Pennsylvania	Aug. 2, 1871	do	Yes	1,600 00
H. W. King	First-class clerk	District of Columbia	Mar. 17, 1869	do	Yes	1,200 00
John Cassin	do	Maryland	Feb. 13, 1873	do	No	1,200 00
M. L. Coxall	do	Indiana	July 1, 1878	do	No	1,200 00
A. D. Wilcox	do	Tennessee	Jan. 4, 1875	do	No	1,200 00
Mortimer Clarke	Clerk	District of Columbia	Oct. 1, 1878	do	No	1,000 00
B. F. Peters	do	Pennsylvania	June 16, 1881	do	No	1,000 00
William A. Torrey	do	New York	Dec. 1, 1881	do	No	1,000 00
Lindsay Muse	Messenger	Virginia	Jan. 1, 1829	Colored	No; was exempt	840 00
William Pierre	do	District of Columbia	Jan. 1, 1858	do	do	840 00
John M. Evans	Laborer	do	Mar. 1, 1869	do	Yes	660 00
Henry Wiggenton	do	do	May —, 1870	do	No	660 00
BUREAU OF YARDS AND DOCKS.						
A. E. Merritt	Chief clerk	Connecticut	July 10, 1857	White	No	1,800 00
George Mackay	Draughtsman	New York	Oct. 10, 1877	do	Volunteer Army	1,800 00
D. J. Partello	Fourth-class clerk	New Jersey	Oct. 1, 1866	do	do	1,800 00
Robert H. Yeatman	Third-class clerk	District of Columbia	Sept. 7, 1869	do	do	1,600 00
Charles Fair	Second-class clerk	Pennsylvania	Sept. 2, 1871	do	do	1,400 00
John R. Graham	First-class clerk	New Jersey	Jan. 1, 1875	do	No	1,200 00
J. A. Kingsley	Clerk	District of Columbia	Aug. 6. 1870	do	No	1,000 00
Nathan Addison	Assistant messenger	do	Aug. 5, 1875	Colored	Volunteer Army	720 00
Frederick Mason	Laborer	do	Feb. —, 1874	do	No	660 00
Temporary force.						
Frank H. Case	Writer	Indiana	Dec. 18, 1880	White	Volunteer and regular	1,000 00
H. O. French	Carpenter	New Hampshire	Apr. 1, 1881	do	No	$90 per month.
Andrew O'Neil	Watchman	New Jersey	May 1, 1877	do	No	60 per month.
P. T. McCurdy	do	Pennsylvania	Dec, 23, 1880	do	Army	60 per month.

Harriet Warren	Scrubber	District of Columbia	May 1, 1879	Colored	No	15 per month.
Minnie Holmes	do	do	May —, 1881	White	No	15 per month.
BUREAU OF ORDNANCE.						
S. T. Ellis	Chief clerk	District of Columbia	Oct. 1, 1863	White	Volunteer Army	$1,800 00
Charles K. Stellwagen	Draughtsman	Pennsylvania	Oct. 1, 1849	do	No	1,800 00
Thad. K. Sailer	Third-class clerk	do	July 1, 1870	do	No	1,600 00
J. R. Gisburne	Second-class clerk	New York	do	do	Volunteer Army	1,400 00
C. H. Middleton	Assistant messenger	District of Columbia	Dec. 9, 1864	do	do	720 00
George W. Simms	Laborer	do	Aug. 1, 1875	Colored	do	660 00
Temporary.						
P. Quirk	Watchman	District of Columbia	——, 1876	White	Volunteer Army	$60 per month.
J. M. Waters	Laborer	New Jersey	Sept. 1, 1870	Colored	No	55 per month.
BUREAU OF NAVIGATION.						
Louis Waldecker	Chief clerk	District of Columbia	——, 1873	White	No	1,800 00
D. A. Denison	Third-class clerk	Connecticut	——, 1874	do	Volunteer Army	1,600 00
Frank Hamilton	Second-class clerk	New Jersey	——, 1874	do	No	1,400 00
S. S. Howison	Clerk	Virginia	——, 1881	do	No	1,000 00
R. W. Dutton	Assistant messenger	District of Columbia	——, 1881	do	No	720 00
John A. Smith	Laborer	do	——, 1871	Colored	Volunteer Army	660 00
Temporary force.						
Henry W. Wells	Clerk	Pennsylvania	——, 1879	White	No	1,500 00
John H. Brooks	Writer	District of Columbia	——, 1873	Colored	Navy, 1861–75	$3.25 per diem.
James T. Jackson	Laborer	do	——, 1876	do	No	$55 per month.
J. L. Lipscombe	Watchman	Pennsylvania	Apr. 10, 1876	White	Navy	60 per month.
BUREAU OF EQUIPMENT AND RECRUITING.						
S. Henriques	Chief clerk	New York	Sept. 1, 1862	White	Navy	1,800 00
W. W. S. Dyre	Fourth-class clerk	Pennsylvania	Oct. 21, 1862	do	No	1,800 00
James Patterson	Third-class clerk	do	Mar. 29, 1866	do	Army and Navy	1,600 00
D. C. Morrison	Second-class clerk	Michigan	Sept. 1, 1865	do	Army	1,400 00
R. A. Church	do	New York	July 28, 1870	do	do	1,400 00
J. E. Alexander	First-class clerk	Virginia	Sept. 26, 1866	do	Navy	1,200 00
E. A. Roderick	do	Pennsylvania	July 25, 1870	do	do	1,200 00
D. J. Evans	Copyist	Kansas	July 1, 1881	do	Army	900 00
William H. Askew	Assistant messenger	Maryland	May 1, 1879	do	Navy	720 00
Benjamin Harris	Laborer	District of Columbia	Oct. —, 1862	Colored	No	660 00
Temporary.						
J. B. Harrison	Captain of the watch	District of Columbia	——, 1869	White	No	1,200 00

List of clerks and other employés in the Navy Department—Continued.

Name.	Grade of office.	State to which each is charged.	Date of appointment.	White or colored.	In regular or volunteer service of United States during war of rebellion.	Compensation.
BUREAU OF CONSTRUCTION AND REPAIR.						
H. A. Goldsborough	Chief clerk	District of Columbia	Oct. 1, 1865	White	No	$1,800 00
William T. Powell	Draughtsman	Pennsylvania	May 21, 1878	....do	No	1,800 00
R. Knapp	Fourth-class clerk	New York	Aug. 18, 1865	... do	Regular and volunteer Army	1,800 00
C. L. Hughes	Third-class clerk	District of Columbia	Nov. 1, 1870	....do	No	1,600 00
T. J. Lasier	Second-class clerk	New Hampshire	Mar. 1, 1876	....do	No	1,400 00
F. C. Storm	First-class clerk	New York	July 1, 1878	....do	Regular Army	1,200 00
Oliver C. Fisher	Assistant messenger	.....do	April 1, 1862	... do	No	720 00
Alexander Berry	Laborer	District of Columbia	Jan. 1, 1878	Colored	No	660 00
Temporary.						
J. H. Reinburg	Second captain of the watch.	District of Columbia	Feb. 1, 1874	White	United States Navy	900 00
BUREAU OF STEAM ENGINEERING.						
William H. H. Smith	Chief clerk	Wisconsin	July 1, 1864	White	No	1,800 00
George B. Whiting	Draughtsman	District of Columbia	Nov. 1, 1868	....do	Navy	2,250 00
A. P. M. Maschmeyer	Assistant draughtsman	Maryland	Oct. 27, 1879	.. do	No	1,400 00
George Schultz	Second-class clerk	District of Columbia	Aug. 5, 1867	....do	Army	1,400 00
Wilton G. Shock	First-class clerk	Maryland	July 1, 1878	....do	Navy	1,200 00
J. H. Hoagland	Clerk	New Jersey	July 17, 1869	....do	Army	1,000 00
William L. Moseley	Assistant messenger	Ohio	Apr. 22, 1881	....do	.....do	720 00
R. T. Iverson	Laborer	District of Columbia	June —, 1871	Colored	No	660 00
Moses Lacy	.....do	.....do	July 1, 1880	....do	Navy	660 00
Temporary.						
J. R. Knox	Watchman	Virginia	——, 1871	White	Volunteer	720 00
J. P. Donnelly	.....do	New Jersey	Mar. 1, 1876	....do	.....do	720 00
BUREAU OF MEDICINE AND SURGERY.						
D. Carrigan	Chief clerk	Maryland	May 1, 1865	White	No	1,800 00
E. C. Kirkwood	Third-class clerk	.....do	April 1, 1867	....do	Volunteer Army	1,600 00
Benjamin White	Second-class clerk	.....do	July 1, 1878	....do	No	1,400 00
Thomas C. Quantrill	First-class clerk	Colorado	July 1, 1880	....do	No	1,200 00
P. Bryson Wood	Clerk	Maryland	July 1, 1880	....do	No	1,000 00

Marsh B. Clark	Assistant messenger	Pennsylvania	Sept. 1, 1842	....do	No	720 00
Henry Clay	Laborer	District of Columbia	Oct. 1, 1871	Colored	Volunteer Army	660 00
Temporary.						
James Minor	Janitor	District of Columbia	Sept. 9, 1872	Colored	No	$50 per month.
John Bunder	Laborer	....do		....do	Regular Army	40 per month.
George E. Doering	Assistant chemist	....do	Sept. 15, 1880	White	No	40 per month.
BUREAU OF PROVISIONS AND CLOTHING.						
J. F. Denson	Chief clerk	Virginia	May 1, 1864	White	Regular Navy	1, 800 00
J. W. Moorhead	Fourth-class clerk	Maine	June 16, 1864	....do	No	1, 800 00
J. K. Lewis	Third-class clerk	District of Columbia	Apr. 19, 1864	....do	No	1, 600 00
W. H. Doe	....do	Massachusetts	Nov. 1, 1865	... do	Volunteer	1, 600 00
H. H. Tilley	Second-class clerk	Rhode Island	Aug. 1, 1861	....do	No	1, 400 00
M. S. Thompson	....do	Iowa	July 1, 1881	... do	No	1, 400 00
A. T. Jenckes	First-class clerk	Rhode Island	July 1, 1865	.. do	No	1, 200 00
H. E. Quinn	....do	New Jersey	Jan. 17, 1876	....do	No	1, 200 00
George W. Blake	....do	Massachusetts	Dec. 31, 1871	... do	Volunteer	1, 200 00
William Lucas	Assistant messenger	District of Columbia	Aug. 6, 1861	....do	No	720 00
Samuel West	Laborer	Maryland	June 14, 1875	Colored	Regular Army	660 00
Temporary.						
W. S. Gibson	Writer	Pennsylvania	Jan. 21, 1878	White	No	$100 per month.
Miss M. M. Heath	....do	Virginia	Feb. 1, 1881	....do	No	75 per month.
James Boyce	Watchman	Connecticut	May 1, 1880	....do	Volunteer	720 00
L. R. Jones	....do	Maryland	——, 1874	....do	No	720 00
John Fagin	Laborer	Virginia	Oct. 1, 1875	Colored	No	55 per month.
OFFICE OF THE JUDGE-ADVOCATE-GENERAL.						
Chas. L. Kelsey	Third-class clerk	Kansas	Feb. 1, 1875	White	No	1, 000 00
F. E. Waterman	Clerk	Ohio	Jan. 15, 1881	....do	No	1, 600 00
EMPLOYÉS AT THE NAUTICAL ALMANAC OFFICE.*						
E. J. Loomis	Clerk and assistant	Virginia	——, 1850	White	No	1, 600 00
G. W. Hill	Assistant	New York	——, 1861	....do	No	1, 600 00
D. P. Todd	....do	Washington, D. C	——, 1878	....do	No	1, 500 00
J. Weissner, sr	....do	....do	——, 1866	....do	No	1, 500 00
J. Downes	....do	Pennsylvania	——, 1850	....do	No	1, 200 00
J. Meier	....do	Washington, D. C	——, 1878	... do	No	1, 200 00
J. Weissner, jr	.... do	....do	——, 1877	... do	No	90 per month.
S. J. Corrigan	....do	Minnesota	——, 1881	... do	No	75 per month.
J. C. Hart	....do	New Jersey	——, 1869	Colored	Navy	60 per month.

* The persons appointed to the Nautical Almanac office are selected with special reference to their qualifications as professional mathematicians and computers.

List of clerks and other employés in the Navy Department—Continued.

Name.	Grade of office.	State to which each is charged.	Date of appointment.	White or colored.	In regular or volunteer service of United States during war of rebellion.	Compensation.
CIVIL EMPLOYÉS NAVY DEPARTMENT BUILDING.						
F. H. Stickney	Superintendent	Maine	——, 1874	White	No	$250 00
E. D. Crouch	Engineer	Maryland	Apr. 1, 1881	do	Military	1,200 00
S. H. Sentenne	Assistant engineer	New York	Apr. 24, 1879	do	Volunteer	1,000 00
C. Ludington	Conductor of elevator	do	May 5, 1881	do	No	720 00
John Howlett	Watchman	District of Columbia	Apr. 27, 1877	do	No	720 00
J. P. Lucas	do	do	Jan. 1, 1875	do	Volunteer	720 00
John A. Simms	do	do	July 1, 1880	Colored	No	720 00
George A. Tavenner	do	Virginia	Jan. 1, 1880	White	Volunteer (few days)	720 00
D. H. Royer	do	Pennsylvania	July 3, 1879	do	No	720 00
William Shanks	do	Maryland	June 5, 1879	do	No	720 00
W. P. Watrous	do	Ohio	July —, 1880	do	No	720 00
James Logan	do	Illinois	May 16, 1881	do	Navy	720 00
H. A. Blanchard	do	Delaware	July 12, 1881	do	Volunteer	720 00
John Hall	Fireman	District of Columbia	July 1, 1879	do	No	720 00
Richard Kerr	do	New Jersey	July 1, 1879	do	No	720 00
T. H. Dorian	do	New York	July 2, 1879	do	No	720 00
Overton Bond	Laborer	Maryland	——, 1861	Colored	No	660 00
William Herbert	do	do	July —, 1860	do	No	660 00
William M. Ellis	do	District of Columbia	Jan. —, 1876	do	Regular Navy	660 00
H. T. Bruce	do	Louisiana	Sept. 1, 1881	White	No	660 00
Margaret Thompson	Char-woman	District of Columbia	Jan. —, 1880	do		180 00
Mary Joyce	do	do	Apr. —, 1879	do		180 00
Martha Lee	do	Virginia	Apr. —, 1879	Colored	Army	180 00
Jane Bond	do	District of Columbia	Apr. —, 1879	do		180 00
Martha Williams	do	Virginia	Apr. —, 1879	do	Navy	180 00
Martha Kendrick	do	do	Apr. —, 1879	White		180 00
Rebecca Thomas	do	District of Columbia	Apr. —, 1879	Colored		180 00
Kate Pace	do	do	Apr. —, 1879	White	Navy	180 00
Fanny Warner	do	do	Apr. —, 1879	Colored		180 00
Mary Colbert	do	Virginia	Apr. —, 1879	do		180 00
Celia Johnson	do	District of Columbia	Apr. —, 1879	do		180 00
Harriet Lewis	do	do	Nov. —, 1881	do		180 00
*CIVIL EMPLOYÉS IN THE UNITED STATES HYDROGRAPHIC OFFICE.						
Thomas T. Thurlow	Writer	Pennsylvania	Jan. 1, 1869	White	Volunteer	$120 00 per month.
John S. Stodder	do	Massachusetts	Nov. 30, 1880	do	do	120 00 per month.
Ernst R. Knorr	In charge of drafting and engraving.	District of Columbia	Nov. —, 1869	do	No	200 00 per month.

Gustave Herrle	Drafting	New York	Sept. 17, 1872	do	No	133 33 per month.
William R. Hesselbach	do	do	Sept. 2, 1871	do	Army	80 00 per month.
Leon Dessez	do	Virginia	Feb. 3, 1874	do	No	108 33 per month.
Charles Schlaar	do	New York	Jan. 4, 1873	do	Volunteer	108 33 per month.
J. J. Webber	do	Ohio	Oct. 1, 1875	do	Regular Army	108 33 per month.
William M. Whiting	do	District of Columbia	Nov. 1, 1878	do	No	100 00 per month.
Henry G. Brewer	do	Maryland	Apr. 1, 1879	do	No	108 33 per month.
C. F. P. Peterson	do	District of Columbia	Aug. 14, 1879	do	No	91 66 per month.
Charles Mahon	do	Maryland	Oct 23, 1879	do	No	116 66 per month.
C. T. Klakring	Engraving	District of Columbia	Mar. 15, 1868	do	No	108 33 per month.
Charles E. Birch	do	do	Nov. 8, 1869	do	No	125 00 per month.
J. A. Waddey	do	do	Mar. 11, 1872	do	No	100 00 per month.
J. L. Hazzard	do	Pennsylvania	July 9, 1877	do	Volunteer	100 00 per month.
S. J. Kubel	do	District of Columbia	June 25, 1878	do	No	100 00 per month.
Charles Kolb	do	Virginia	Sept. 24, 1880	do	No	58 33 per month.
Charles LaHayne	Plate-printing	New York	Mar. 21, 1874	do	No	4 50 per day.
Thomas Devine	do	Maryland	Dec. 3, 1870	do	No	4 00 per day.
Miss Martha M. Smith	Writer	New York	Apr. —, 1877	do		75 00 per month.
Miss Eliza A. Scott	Painting lights on charts	Maryland	Nov. 1, 1878	do		75 00 per month.
Miss Annie C. Vogel	Writer	New York	Oct. 22, 1879	do		75 00 per month.
Miss Grace L. Willcox	do	Maryland	July 9, 1880	do		75 00 per month.
T. H. Lawrence	Laborer	New York	June 9, 1880	do	Volunteer	55 00 per month.
Daniel M. Goodacre	do	Maryland	Nov. 10, 1873	do	do	55 00 per month.
Henry Jacob	do	District of Columbia	Nov. 1, 1878	do	No	55 00 per month.
Henry Johnson	do	do	July 1, 1866	Colored	No	55 00 per month.
George Beanes	do	do	Mar. 15, 1866	do	Volunteer	55 00 per month.
Joseph N. Mayne	do	do	Oct. —, 1869	do	do	55 00 per month.
William H. Wilson	Filing records	Pennsylvania	July 1, 1871		do	60 00 per month.
William F. B. Wall	Apprentice to printing	District of Columbia	Nov. 30, 1880		No	15 00 per month.
Robert Lias	Office boy	Virginia	Oct. —, 1880	Colored	No	15 00 per month.
EMPLOYÉS OF UNITED STATES NAVAL OBSERVATORY.						
A. N. Skinner	Assistant astronomer	Illinois	Mar. 28, 1870	White	No	1, 900 00
Miles Rock	do	Pennsylvania	July 1, 1880	do	Volunteer	1, 500 00
W. C. Winlock	do	Massachusetts	Aug. 2, 1880	do	No	1, 500 00
Thomas Harrison	Clerk	District of Columbia	Nov. 9, 1848	do	No	1, 800 00
Albert S. Flint	Computer	Massachusetts	Apr. 1, 1881	do	No	100 00 per month.
W. F. Gardner	Instrument-maker	Maryland	Nov. 1, 1866	do	Volunteer (3 months, 3 months men).	125 00 per month.
James K. Watt	Gardener	District of Columbia	Aug. 1, 1863	do	do	83 33 per month.
Thomas Hays	Watchman	do	July 26, 1852	do	do	60 00 per month.
Dennis Horigan	do	do	Aug. 3, 1858	do	do	60 00 per month.
Nicholas Cahill	do	do	July 1, 1867	do	do	60 00 per month.
Richard Smith	Messenger	do	July 1, 1864	Colored	do	53 22 per month.
John Thornton	Porter	do	Jan. 1, 1863	do	do	53 22 per month.

* The employés of the Hydrographic Office are selected for their special qualifications as draughtsmen, engravers, &c.

List of clerks and other employés in the Navy Department—Continued.

TEMPORARY EMPLOYÉS IN NAVY DEPARTMENT.

Names.	Grade of office.	State to which each is charged.	Date of appointment.	White or colored.	In regular or volunteer service of United States during war of rebellion.	Compensation.
						Per month.
R. B. Porter	Secretary to inspection board.	District of Columbia	Mar. 24, 1877	White	No	$125 00
Jas. C. Dulin	Secretary to examining board.	do	——, 1864	do	No	117 00
E. W. S. Moore	Clerk	West Virginia	Jan. —, 1881	do	No	116 66
W. R. Browne	Librarian	Massachusetts	June —, 1878	do	Volunteer Navy	110 00
Halleck Donoho	Clerk	District of Columbia	June —, 1878	do	No	100 00
John C. Hunter	do	do	Sept. 15, 1880	do	No	100 00
William Wirt	do	Virginia	June 1, 1880	do	No	100 00
J. H. Kirkwood	do	Maryland	Apr. —, 1881	do	No	100 00
Rufus Prentice	Copyist	District of Columbia	——, 1875	do	No	90 00
W. R. Handy	do	do	July —, 1880	do	No	83 33
John E. Trudeau	do	Louisiana	Mar. —, 1881	do	No	75 00
Mrs. M. Thompson	Telegraph operator	New York	——, 1877	do	No	83 33
Mrs. M. E. Bowden	Copyist	Virginia	Oct. —, 1880	do	No	60 00
Mrs. A. B. Monroe	do	District of Columbia	Sept. —, 1880	do	No	60 00
Mrs. M. Wysong	do	New Jersey	July 1, 1880	do	No	60 00
Mrs. F. McBlair	do	District of Columbia	Mar. —, 1881	do	No	60 00
Mrs. S. A. Shelby	do	Mississippi	July —, 1881	do	No	60 00
Miss S. Culbertson	do	Indiana	July —, 1880	do	Volunteer (hospital service)	60 00
Miss F. Cunningham	do	District of Columbia	July —, 1877	do	No	60 00
Miss M. Bleecker	do	New York	Mar. —, 1881	do	No	60 00
Mrs. E. Call Long	do	Florida	Apr. —, 1881	do	No	60 00
Miss M. A. May	do	Louisiana	Apr. —, 1881	do	No	60 00
Miss M. A. Austin	do	do	June —, 1881	do	No	60 00
R. D. Mohun	do	District of Columbia	Mar. —, 1881	do	No	60 00
J. R. Boss	Printer	do	July —, 1880	do	No	$3 20 per day.
Edmund Shaw	do	do	Aug. —, 1881	do	No	45 00
William Wilkes	Messenger to inspection board.	Maryland	Feb. —, 1871	Colored	Volunteer Navy	55 00
Charles Watts	Messenger to examining board.	District of Columbia	——, 1870	do	No	55 00
R. P. Randolph	Laborer	Louisiana	Apr. —, 1881	do	Volunteer	55 00
Henry Dorkins	do	Maryland	June —, 1879	do	No	55 00
Samuel Johnson	Messenger	District of Columbia	July —, 1879	do	Volunteer	50 00
William F. Thomas	do	do	Mar. 21, 1881	do	Regular Navy	50 00
W. B. Darrell	Assistant conductor of elevator.	do	Dec. 23, 1880	White	No	41 66
E. S. Cassin	Messenger (boy)	do	May —, 1879	do	No	35 00
W. C. Mason	do	Indiana	May —, 1879	do	No	20 00

Antonio Biondi	Laborer	District of Columbia	Aug. 1, 1877	....do	No	60 00
Lewis Patton	.....do	.....do	July —, 1880	Colored	No	55 00
James Burke	.....do	Virginia	Jan. —, 1881	....do	Volunteer	55 00
Brook Shaw	.....do	District of Columbia	July —, 1879	....do	No	30 00
Margaret Goldsmith	In charge of scrubbers	.....do	Apr. —, 1879	White	No	25 00
Margaret Purcell	Scrubbers, &c	.....do	May —, 1881	....do	No	15 00
Mary Finacom	.....do	.....do	June —, 1881	....do	No	15 00
Emma High	.....do	.....do	July —, 1881	....do	No	15 00
Mary J. Matthews	.....do	.....do	Apr. —, 1881	Colored	No	15 00
Delia Robinson	.....do	.....do	Nov. 16, 1881	....do	No	15 00
Philip Hart	Laborer	Michigan	Dec. 1, 1881	White	No	55 00

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47TH CONGRESS, 1st Session. } SENATE. { EX. DOC. No. 18.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING

A communication from the Chief of Engineers, dated the 13th instant, covering copy of report of Maj. W. E. Merrill, Corps of Engineers, upon an examination of Clarion River from its mouth to Ridgway, Pa.

DECEMBER 16, 1881.—Referred to the Committee on Commerce and ordered to be printed.

WAR DEPARTMENT,
Washington City, December 15, 1881.

The Secretary of War has the honor to transmit to the United States Senate, for the information of the Committee on Commerce, a communication from the Chief of Engineers, dated the 13th instant, covering copy of report of Maj. W. E. Merrill, Corps of Engineers, upon an examination of Clarion River from its mouth to Ridgway, Pa., made in compliance with provisions in the river and harbor act of March 3, 1881.

ROBERT T. LINCOLN,
Secretary of War.

The PRESIDENT *pro tempore*,
of the United States Senate.

OFFICE OF THE CHIEF OF ENGINEERS,
UNITED STATES ARMY,
Washington, D. C., December 13, 1881.

SIR: I have the honor to submit herewith a copy of a report to this office from Maj. William E. Merrill, Corps of Engineers, of an examination of Clarion River from its mouth to Ridgway, Pa., made under his direction, to comply with requirements of the river and harbor act of March 3, 1881.

Very respectfully, your obedient servant,

H. G. WRIGHT,
Chief of Engineers, Brig. and Bvt. Maj. Gen.

Hon. ROBERT T. LINCOLN,
Secretary of War.

SURVEY OF THE CLARION RIVER FROM ITS MOUTH TO RIDGWAY, PENNSYLVANIA.

UNITED STATES ENGINEER OFFICE,
Cincinnati, Ohio, October 28, 1881.

GENERAL: I have the honor to submit the following report on the "Survey of the Clarion River from its mouth to Ridgway, Pa.," ordered in the last river and harbor act, and assigned to me by your letter of March 21, 1881.

I succeeded in procuring the valuable services of Mr. James Worrall, civil engineer, to take charge of the field work of the survey. Besides being generally familiar with all of the water-ways of Pennsylvania, from long years of professional service within the State, Mr. Worrall had already reported, under the direction of this office, upon the Kiskiminetas and its tributary, the Conemaugh, and on the Red Bank, both being tributaries of the Allegheny. His report on the Clarion completes the series of reports on the main tributaries of the Allegheny River heading on the western slope of the Allegheny Mountains.

The Clarion rises in McKean County, Pennsylvania, and drains an area of 986 square miles. From Ridgway to its mouth is 82 miles. In this distance the river falls 507 feet, being at the rate of 6 feet 2 inches per mile. It is from 450 to 600 feet in width, and the heights of floods are from 10 to 12 feet.

The only commerce on the Clarion is the rafting of timber and its products. The pine and hemlock have been thinned out, but abundance of hard wood is yet untouched. Bark is produced in large quantities, and there are many extensive tanning establishments in the Clarion Valley. Iron ore is found in the hills, and on the headwaters of the Toby there are also extensive deposits of coal. The Clarion lumber mills have a capacity of 125,000,000 feet, and in 1880 there was floated down the river 25,000,000 feet of boards, 2,500,000 cubic feet of timber, 5,000,000 shingles, and 1,000,000 laths. In the same year 750 boat bottoms were built for the coal trade of Pittsburgh.

It is evident from the heavy slope of the river that while it is practicable to help open navigation by removing rocks and other obstructions, and smoothing down the roughness of the bed and banks, no increase in navigable depth can be expected. For this class of work Mr. Worrall submits an estimate of $40,000. Advantageous results can be produced by any part of this sum, as the work to be done is made up of innumerable independent small jobs.

It is the desire of many of the lumber dealers that the government should build a few "bear-trap" dams, similar to those that are used in the lumber business elsewhere. Mr. Worrall estimates that three such dams, built of crib-work in the usual manner, would cost $40,000.

For the reason stated in connection with a similar recommendation for the Red Bank (House Ex. Doc. No. 86, Forty-sixty Congress, third session), while approving in general of the use of bear-trap dams in lumbering, I cannot recommend their construction by the United States.

A radical improvement of the Clarion by locks and dams, which would give continuous navigation in both directions, would cost about $6,000,000. While the time and conditions may come that will justify such an expenditure, it certainly has not yet arrived. Until the main artery, the Allegheny, is radically improved, it is out of place to attempt anything on the tributaries, except the reduction of the natural asperities.

For the details of this survey I would refer to the map and accompanying report prepared by Mr. James Worrall.

Respectfully submitted.

WM. E. MERRILL,
Major of Engineers.

Brig. Gen. H. G. WRIGHT,
Chief of Engineers, U. S. A.

REPORT OF MR. JAMES WORRALL, CIVIL ENGINEER.

HARRISBURG, PA., *September* 28, 1881.

SIR: I have the honor of reporting to you on another of the series of streams falling into the Allegheny on its left and heading in the great water-shed of Pennsylvania, which contributes supplies to rivers that fall into the Gulf of Mexico, and into the Northern Atlantic.

In my report on Red Bank I endeavored to explain the structure of this country, drawing attention to that gore of land, as it may be called, which is bounded by the Allegheny Mountains and the Allegheny and Ohio rivers, which, for its acreage, may be set down, without exaggeration, as the most valuable area as to its inherent productiveness to be found certainly in the United States, and possibly in the world. A vast portion of the land now lying west and north of the Allegheny Mountains, and indeed a large portion lying south and east of them, was once, as I have stated in former reports, the bottom of an ocean, which bottom was created by sediment, although its thickness exceeds in many places 6 miles. The stratifications were level, and exhibit fossil remains in the lowest of them. When the Allegheny Mountains arose these stratifications were very much disturbed, and east and south of the vertex the remains of that disturbance may now be seen in the rough surface of Pennsylvania, Maryland, and Virginia, North and South Carolina, &c.; but north and west of that vertex the stratifications have simply been raised, exhibiting now an inclined plane declining gently toward the north and west. The strata moved but little from their horizontal position, but are cracked in various directions just as such strata would be as a result of a tilting force. A large crevice in these strata now contains the Ohio and the Allegheny rivers, and smaller crevices convey the waters of many tributaries from both sides to this main one. The northern end of these crevices conducts the water of the Allegheny and its tributaries to the Ohio, and it is with the streams falling into the main course with which we have to do.

The main head branch of the Allegheny may be called the Clarion, which falls into the Allegheny at a short distance north of the Red Bank, the last river on which I have reported to you. I have stated the value of the gore of land through which these rivers flow on account of the immense mineral wealth it exhibits, besides being rich on the surface for agricultural purposes.

The subterranean wealth is in its greatest abundance in West Virginia and southwest Pennsylvania, thinning down as you go north. The Western Virginia rivers and then the Monongahela, the Kiskiminetas, and the Conemaugh may be said to pass through the central and richest portion of this wealthy field; the Mahoning, however, the Red Bank, and the Clarion also water a very rich area. The Kiskiminetas and the Red Bank I have reported upon, and now we come to the Clarion.

All these streams were made by nature to conduct the wealth of their banks to the Mississippi Valley, the prospective center of a dense population, and several of them can be so treated as to become vehicles for the transportation of the same wealth to the Atlantic coast.

No device of man is likely to offer cheaper means of transportation than these streams will do when improved. They may be set aside for the present, but they are bound to be availed of in the end. They are all alike, with smooth, rocky bottoms and gentle falls, scarcely exceeding 9 feet in the mile. They all have been already availed of in flush times, and have assisted transportation to an extent which has greatly helped toward populating the country through which they pass. But the railway is beginning to permeate the region now, and the facilities offered by the streams are neglected. This cannot continue forever. These streams can all of them be so improved as during the temperate months to offer facilities of transportation to every person, from the man with the limestone or ore scow to the great manufacturing establishment spending millions per annum for freight alone.

The Kiskiminetas, with its Johnstown, I have treated of in former reports. The Red Bank and its capabilities have been also examined and reported upon. The Clarion, last, though, all things considered, not by any means least, is now before us. The mineral wealth of the Clarion may not be so very great as that of the more southern streams, but its upper branches interlock with those of their wealthy neighbors, and present us the mineral bounty of nature in nearly equal abundance.

The Clarion has heads in McKean and Elk and some of the adjoining counties, pass-

ing through and along Forest, Jefferson, and Clarion counties, to a point on the Allegheny some 12 or 14 miles above the mouth of Red Bank, or, say 70 miles above Pittsburgh.

The surface of the country through which the Clarion passes is alluvial, like all the rest of the country west of the Alleghenies. The sylvan products were originally the same. Pine, hemlock, &c., of the softer woods, and beeches, maples, birches, some poplars, and a tracing of oak, while there are groves of cherry which have recently furnished, amongst the harder, a rich article of commerce. Wood rights are often sold now for a price which would, until recently, have purchased the surface in fee and offer fine pastoral facilities besides.

The streams here have all shaped their own beds, following the crevices which were created by the disturbance which caused the rise of the sedimentary stratifications. The top surface of the country is surprisingly even, and there are large areas in the nature of table-lands, which are already in a high state of cultivation. The sylva here indicates tanning as a branch of business which would naturally be prosecuted energetically, and, indeed, some of the most extensive tanning establishments in the country are already to be found along the Clarion. The pines and hemlocks have been a good deal thinned out, but groves of the harder woods are now attracting the lumberman, who, with his portable saw-mill, permeates the solitudes and draws the result of his cuts to the banks of the stream or to the nearest railway on sleds.

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But beneath the surface there remains the mineral wealth; tap it almost anywhere and it spouts oil; bore down, drive shafts almost anywhere and the richest coal is developed, whilst iron and limestone are almost always in reach; the sandstone for glass manufacture and fire clay for bricks are also often found. All these sources of wealth exist along the Clarion and its branches, especially those branches that come in from the left. The great New York trunk lines of railway are protruding branches into this country now for the sake of its mineral, sylvan, and agricultural products.

The headwaters of the Little Toby branch present coal and iron ore in inexhaustible quantities. Red Bank Valley will be in a few months the location of one of the grand trunk lines from New York to the great West, will be one of our grand thoroughfares—a main street, as it were, of this continental city. The country now is hardly aroused out of its primitive state, yet in a few years what will be—what must be the result? What the New York Central Railroad did for Central and Northern New York this new grand thoroughfare will do for Central and Western Pennsylvania. Yet this new grand connection will be effected in a few months, certainly within two years. It is hard to conceive of a more promising opening for the irresistible enterprise of our energetic people.

Now, here are a series of streams whose banks teem with all kinds of mundane wealth, except the precious metals, and it is questionable whether our iron is not more valuable than those. These streams being generically alike they can all be improved in the same manner. The Allegheny should be the first to be operated upon. Its regimen has been heretofore described. It certainly can be improved by locks and dams, and all the branches can be improved in the same way. The plan proposed for the Kiskiminetas and the Red Bank can be adopted here. The Clarion can be improved to a point some 15 miles above the point prescribed in my instructions to examine, or to Wilcox instead of to Ridgway. Wilcox can be made a central point, from which to ship the products which surround it, and that freight will be coal, lumber, and oil (unless pipe lines eventually monopolize it), leather, and the products of the fields. The time will come when all things can be carried on these water-ways for less than one cent per ton per mile, perhaps even for five mills. It is simply absurd to say that railways can ever reach so low a charge and pay. They may offer to do it, and may do it, for the purpose of discrediting water carriage, but there always comes an end to the business of working for less than nothing.

There remains, then, to show the amount of work to be done, and about what it would cost, to improve the Clarion from its mouth to Wilcox by a series of locks and dams accommodating vessels of 300 tons, the limit of the interior capacity of Pennsylvania for water-ways. Canal 70 feet wide on bottom, 7 feet deep; locks 120 by 20 between gates.

ESTIMATE FOR A SLACK-WATER NAVIGATION OF CLARION RIVER.

63 dams required from mouth to Wilcox, at $40,000	$2,520,000
636 vertical feet of lockage, at $2,500	1,590,000
506,880 linear feet of towing path, at $2	1,013,760
Contingencies, bridges, &c	150,000
	5,273,760
Add 10 per cent. for contingencies	527,376
Total	5,801,136

It might be objected that such a navigation so isolated and without eastern connection could hardly be called for, for a very long period. There is, however, a case parallel to this where such a canal was and is of immense service to the country through which it passes. The Schuylkill Canal of Pennsylvania is almost exactly analogous to it. That work is very nearly the same in length, passes through a rich agricultural country, with a mineral region at its head. Compare the ultimate productiveness of the Clarion River country with that of the Schuylkill and the wealth, both agricultural and mineral, of the western valley will equal if not surpass that of its eastern prototype, and as for a market or destination for that wealth the Mississippi Valley promises a demand in the future not likely to be surpassed even by that of the Atlantic seaboard.

But I must reiterate my recommendation in reference to facilitating downward navigation on the Clarion. The Du Bois dam applied here would improve the downward navigation as it would that of the Red Bank and the other streams. You do not agree with me in this recommendation in reference to Red Bank, and it may, indeed, be questionable whether the United States should make these tentative experiments. The fact remains, however, that these adjustable dams are an ingenious and beautiful invention, which will finally be expanded into a system that may possibly set aside the lock which has held its place for four centuries. Ingenious men are already direct-their attention to this application of hydraulic forces, and that the old lock of the two clockmakers Domenico, at Viterbo, in Italy, adopted by Leonardo Da Vinci exactly four hundred years ago, and since universally used, may be set aside by the beautiful invention of the Pennsylvania Quaker engineer, Josiah White, improved by the minds of his followers, is not at all improbable. The possibilities to result from the "bear trap" can be imagined; they are not as yet developed, but are in the process of development, and some day they may prove to be the truest and best method for availing ourselves of the capacities of streams in our transportation both up and down. An application of some $30,000 to $50,000 to an experiment on the large scale on one of these streams under consideration might lead to a solution of the question of water communication; and would not this be worth the money?

Suppose locks to be set aside and an improved sluice-way to take their place, what an immense material benefit might be conferred upon our people who are, to the least considerable individual of them, interested in transportation!

The fall of the Clarion from Wilcox to the mouth is about 6.5 feet per mile; more gentle than the declination ascertained for the other streams, demonstrating, however, our theory of the physical geography of the country. The length of the river between these points is 96 miles.

To remove the obstructions to an ordinary down-stream navigation for the Clarion would cost about $40,000,* and to introduce, say three Du Bois dams, which would at least treble its capacity, would cost about $40,000* more; which (if either) of these modes of improvement should be adopted and carried out by the United States, I do not pretend to say. That they are the true methods for initiating an improvement I cannot doubt.

It has been seen that a thorough permanent slackwater navigation from the mouth to Wilcox would cost $5,801,136. Perhaps it were better to have the people make the initiatory improvements, leaving to the government the task of a permanent navigation when the time comes to improve all of our important streams west of the Allegheny Mountains and rendered national by their connection with the Mississippi Valley.

I append a memorandum of some of the business now carried on upon the Clarion, obtained from reliable sources by my assistant while prosecuting the reconnaissance of its banks; also a list of points which may be improved for rafting on the river.

It is plain that if facilities of transportation were created, there would be plenty for them to do. A sketch and profile accompanies this report, the data for which were obtained entirely from papers and surveys to be found in the court towns of the neighboring counties, and from recent surveys of the oil regions. These data will be found to be essentially correct, although not derived from surveys made by myself or under my supervision, the means at my disposal being insufficient for an actual traverse of the valley. The data. however, may be accepted as a guide in future to a more accurate and comprehensive survey, conveying a very fair idea of the state of things at the present moment.

I recapitulate the estimates here—

For a slackwater navigation of the Clarion River	$5,801,136
For improvement of down-stream navigation by means of the Du Bois adjustable dam	40,000
For improvement of raft channel	40,000

*See estimate in detail appended.

I have been ably assisted by Mr. E. H. Worrall, civil engineer, whose report follows this.

Thanks are specially due to G. A. Rathburn, esq., attorney-at-law, and Geo. D, Messenger, esq., of Ridgway, and to Mr. R. Rulofson, of Strattonville, and W. W. Greenland, esq., of Clarion, for the statistical information they have furnished and the facilities they rendered available in this reconnaissance.

I have the honor to remain, very respectfully, your obedient servant,

JAMES WORRALL,
Civil Engineer, Assistant.

Bvt. Col. WILLIAM E. MERRILL,
Major of Engineers.

REPORT OF MR. E. H. WORRALL.

List of points that may require improvement.

Name of location.	Distance from mouth of river in miles.	Elevation above tide in feet.	Character of obstruction.	Dimensions.				Proposed improvement.	Estimated cost.
				Length of shoal.	Width of river.	Depth on shoal.	Fall in feet.		
				Ft.	*Ft.*	*In.*			
Big Falls	3	882	Dangerous rocks, rapid and tortuous.	1,000	400	18	10	Removal of rocks and dike to direct current.	$2,000
Turnip Hole	12	932	Broad and shoal	800	400	10	4	Jetty protection	1,200
Callensburg or Plumber's Dam.	18	992	Channel tortuous and rapid.	1,500	400	20	6	Channel needs straightening.	2,250
Clarion	32	1,042	Dangerous rocks	4,800	400	20	10	Rocks should be removed.	7,200
Mill Creek	38	1,062	Broad shoal ripple	1,800	400	10	6	Jetty protection	2,700
State road	42	1,080	Broad shoal ripple with island.	1,500	400	8	5	Wing-dam to island.	2,250
Hemlock	46	1,095	Broad ripple with smooth rock bottom.	800	400	6	4	Jetty protection	1,200
Cooksburg	48	1,114	Channel tortuous, rapid, and obstructed by rocks.	2,500	350	10	7	Channel to be straightened and rocks removed.	3,750
Clarington	53	1,156	Very shoal	1,000	400	7	5	Jetty protection	1,500
Millstone	58	1,181	Very shoal with smooth bottom.	500	400	6	4	do	750
Spring Creek	69	1,255	Very shoal, gravel bottom.	400	350	6	4	do	600
Beech Bottom	80	1,328	Channel tortuous, dangerous rocks.	2,000	300	12	8	Rocks to be removed.	3,000
Portland Shoals	86	1,378	Broad and shoal	7,500	250	7	20	Jetty protection	11,250
Total									39,650

In round numbers $40,000.

NOTES.

Distances from mouth are taken from maps of the oil region and county surveys.
Elevations above tide are averaged from railway and geological surveys.
Length of shoals and width of river were paced off.
Depths were measured and fall obtained with a hand level.
Hemlock ripple was taken from notes of the Clarion Navigation Company.

The tabulated statement of improvements required for open navigation explains itself. The dimensions were taken during July at the time of the reconnaissance, the water being within a few inches of dead low-water.

The dams proposed to be built are on the plan of those who are now using these structures, namely, the sides or abutments of the adjustable dam to be made of crib-work, the floor of heavy planking and also the gates; said abutments to be connected on either side to the banks of the river by a substantial brush dam with crib abutments.

The following locations are proposed for the three dams:

Dam No. 1.—At or near Callensburg, taking advantage of the neighboring pool; the dam entire to be 550 feet long, with 12 feet lift and 40 feet opening in the trap or chamber; estimated cost	$16,500
Dam No. 2.—At or near Cooksburg, where the advantage of a pool is obtained; dam to be 450 feet long, 12 feet lift and 40 feet opening in chamber; cost	13,500
Dam No. 3.—Near Beech Bottom; dam to be 350 feet long, 12 feet lift with 30 feet opening in chamber; cost	10,500
Total	40,500

In round numbers, $40,000.

These estimates are low, but the works could be let to-morrow at a lower figure.

To Mr. George D. Messenger, president of the Clarion River Navigation Company, thanks are due for information concerning the obstructions of the river, thereby enabling the party in the field to push the reconnaissance rapidly.

The bridges over the Clarion, with the exception of the one at Ridgway, offer no serious impediment to either open or slack water navigation; they have from 300 to 450 feet water-way, with spans in no case less than 150 feet, and are built from 25 to 50 feet above the water, crossing where practicable at narrow stretches of the stream and mostly over deep water. At low-water the river will probably average 350 feet of wet surface, excepting, of course, its broad shallows. In the highest water, which is a rise of from 10 to 12 feet, the water seldom leaves its banks or presents a surface of more than 450 to 600 feet in width.

The watershed of the Clarion, obtained from measurements of topographical maps of the counties through which it flows, is 986 square miles. The rainfall of that section is averaged at 38 inches per annum; this (throwing off 6 inches for evaporation, the soakage flowing into the stream, as the whole county is underlaid with rock) gives in round numbers a daily average flow of 200,000,000 cubic feet, and taking an average cross-section of the stream, at, say 300 feet, its probable width due to a depth of 2 feet and velocity at $2\frac{3}{5}$ miles per hour, will give an average daily discharge for the twenty-four hours of 198,000,000 cubic feet nearly. The low-water discharge is, of course, much less than 198,000,000. As the party were not furnished with suitable instruments to gauge the stream, no measurements of that kind were taken. The discharge at low-water stage might be estimated at one-sixth the average or even less.

The area about Clarington, on both sides and below Ridgway, which is naturally tributary to the Clarion, is not less than 800,000 acres; it is still heavily timbered and has no means of transportation except by the river. Most of the pine has been removed and but a few hundred millions left; the hemlock and hard woods are practically untouched, and soon will become very valuable. It is estimated that on this area there are not less than 12,000,000 cords of bark which, at the usual rate of reckoning, would yield 1,000 feet board measure to the cord. This amount does not include cherry, poplar, chestnut, ash, beech, maple, oak, and others that are very valuable and in great demand.

The high banks of the tributaries of the Clarion, especially along the upper waters, are underlaid with bituminous coal and iron ore, which cannot be marketed for lack of transportation on the river in its present state, nor has it yet been reached by any railway. It is well to state, however, that there are now building from the New York State line two lines of railways intended to tap the rich mineral lands near the headwaters of the stream in Elk and McKean counties, which will develop their resources in some measure and give an outlet to this natural wealth.

The scenery along the Clarion is romantic and beautiful, its banks, from 400 to 500 feet in elevation above the valley and washed at their feet by its limpid waters, apparently abrupt and rugged, are covered with the primeval forest and tangled masses of laurel and vines, blooming with wild flowers in the early summer and gorgeous with the autumn tints of their changing foliage in the fall. The soil is naturally fertile, and an improvement of the stream making an easy and sure avenue to market for the materials with which the country teems would make this wild region, as has been said, to blossom as the rose.

The area drained by the Clarion River is as follows:

	Square miles.
In Clarion County	375
In Forest County	70
In Jefferson County	100
In Elk County	393
In McKean County	48
Making a total of	986

This area is mostly heavily timbered; the soil is naturally fertile and requires but cultivation to yield rich harvests and pastures; it is underlaid with minerals, such as

coal, iron ore, fire-clay, glass-rock, &c., and hundreds of wells furnish petroleum for the markets of the world. All of these materials but await feasible means of transportation to make this section one of the richest portions of the State of Pennsylvania.

All of which is respectfully submitted by your obedient servant,

E. H. WORRALL,
Civil Engineer, Assistant.

Col. JAMES WORRALL,
Civil Engineer, Assistant.

STATISTICAL MEMORANDA OBTAINED ON THE BANKS OF THE CLARION ON THE RECONNAISSANCE OF 1881.

List of lumber mills on the Clarion and its tributaries.

Name of mill or owner.	Location.	Capacity in feet, board measure.
Beech Bottom Mill	Arroya	3, 000, 000
Irwin's	do	1, 000, 000
Crabtree	do	2, 000, 000
J. Powl	Grand Mills	2, 000, 000
Henry Raught	do	3, 000, 000
Morehead	Schaffner's Corners	2, 000, 000
Pain & Walters	do	3, 000, 000
M. Duncle	Sigel	1, 000, 000
J. Omsler	do	1, 000, 000
Schockey's	do	1, 000, 000
Wynkoop	Millstone	1, 000, 000
Lathrop & Co	do	2, 000, 000
O'Hara	do	2, 000, 000
Millstone	do	3, 000, 000
J. Frazier	Sigel	2, 000, 000
A. Cook	Cooksville	4, 000, 000
John Cob	do	3, 000, 000
Maple Creek	Clarington	2, 000, 000
John Rhea	Pine Grove	1, 000, 000
D. Hefren	Cooksburg	1, 000, 000
Thompson & Daw	Clarington	3, 000, 000
Wilson & Buzard	Clarion	5, 000, 000
Rits, Buzard & Campbell	do	5, 000, 000
Jacob Hon	do	3, 000, 000
Piney Mills	do	2, 000, 000
Hon & Shaw	do	1, 000, 000
Stofer & Co	Callensburg	1, 000, 000
Heter & Co	do	1, 000, 000
Turnip Hole	do	1, 000, 000
Hemlock Island	Scotch Hill	1, 000, 000
Turkey Run	Saint Petersburg	1, 000, 000
Boyd & Co	Clarington	1, 000, 000
Rulofson & Co	Strattonville	5, 000, 000
Thompson & Moore	Sigel	2, 000, 000
Taylor & Martin	Corsica	3, 000, 000
John Sounger	Sigel	1, 000, 000
Taylor & Co	Tylersburg	2, 000, 000
Wilson & Greenland	Clarion	2, 000, 000
Byron & Co	do	3, 000, 000
Winfield Wilson	do	1, 000, 000
Hyde, Bradley & Co	Portland	5, 000, 000
Bryant & Ennon	Mill Creek	4, 000, 000
J. S. Hyde	Ridgway	1, 500, 000
Whistletown	Whistletown	4, 000, 000
J. S. Hyde	Little Toby	4 000, 000
Elk Lumber Company	Brockport	4, 000, 000
Do	Keystone	6, 000, 000
Firman		1, 000, 000
Alexander		4, 000, 000
Short & Oyster	Galusha	4, 000, 000
J. L. Ellis	Blue Rock	3, 000, 000
Total		124, 500, 000

In the above statement the names of all the lumber mills on the Clarion River that float their produce to market, with their full capacity, have been given, but it is seldom reached. Low-water, poor facilities for transportation, freezing weather, and other incidental detentions prevented.

From statistics gathered at Clarion, the following amounts are returned as approx-

imate to the quantities floated on the river during the year 1880: 25,000,000 feet, B. M., boards; 2,400,000 cubic feet timber; 5,000,000 shingles; and 1,000,000 laths, with probabilities of a greater amount for 1881.

An adjunct to the lumber trade is the manufacture of "boat bottoms," which is extensively conducted on the Clarion, more so than on any other tributary of the Allegheny, because of the greater facilities for obtaining the materials required.

Nearly every mill along the main stream has a boat yard attached to it, the scaffolds on which the boats are built ranging along the river, and in every case occupied by boats in construction. These bottoms, 170 feet long, by 26 feet wide, are floated down the Clarion to the Allegheny, and thence to Pittsburg, where they are sold for about $325 each. Gunwales of from 6 to 8 feet high are then erected on them, and they are loaded with coal (principally), iron, and other articles, and towed down the Ohio and the Mississippi.

Seven hundred and fifty of these bottoms were built on the Clarion in 1880. About 1,000 will be built in 1881. With a certain down-stream navigation at all times (except during frost), this industry would increase and largely contribute to the wealth of that section.

Another manufacture that is obtaining prominence along the Clarion, on account of the facilities for getting hemlock bark, is that of tanning hides. There are two large establishments at Wilcox, two at Ridgway, and the Royal Tannery some 12 miles below. Each of these convert from 700,000 pounds to 1,000,000 pounds of hides a year, which makes from 70,000 to 100,000 sides. At present this business is carried exclusively by rail. With a permanent down-stream navigation, however, a large portion would probably be diverted to the Western and Southern markets.

Although some of the tributaries of the Clarion pass through very rich coal-fields, mining for coal in the immediate vicinity of the main stream is not carried on to any great extent, and such as is mined is mostly consumed in the immediate neighborhood.

Of iron ore there is a considerable amount in the hills adjacent to the Clarion, but it is not worked at present. The abandoned stacks of charcoal furnaces are frequently seen, but their fires have been extinguished for years; lack of cheap transportation, or a thinning out of the forests, may account for this in a measure.

47TH CONGRESS, 1st Session. } SENATE. { EX. DOC. No. 19.

LETTER

FROM THE

SECRETARY OF THE INTERIOR,

TRANSMITTING

Copy of a communication dated 14th instant, from the Commissioner of Indian Affairs, and accompanying draft of a bill to accept and ratify an agreement with the Crow Indians for sale of western portion of their reservation in Montana Territory.

DECEMBER 16, 1881.—Referred to the Committee on Indian Affairs and ordered to b printed.

DEPARTMENT OF THE INTERIOR,
Washington, December 16, 1881.

SIR: I transmit herewith copy communication dated 14th instant, from the Commissioner of Indian Affairs, and accompanying draft of a bill to accept and ratify an agreement with the Crow Indians for sale of western portion of their reservation in Montana Territory.

This agreement is identical with that of May 14, 1880, for the rati. fication of which bills S. 1760 and H. R. 6228 were introduced at second session Forty-sixth Congress, except as to location of the western boundary of the reservation—being a line about ten miles west of the 109th meridian, instead of the meridian—and reducing the cession about 115,200 acres.

This subject is presented for the favorable consideration of Congress, and early action is respectfully requested, as the Crows are impatient, and delay may lead to unpleasant results.

Very respectfully,

S. J. KIRKWOOD,
Secretary.

The PRESIDENT *pro tempore of the Senate.*

DEPARTMENT OF THE INTERIOR,
OFFICE OF INDIAN AFFAIRS,
Washington, December 14, 1881.

SIR: I have the honor to submit herewith, for transmission to Congress, a draft (in duplicate) of a bill to accept and ratify the agreement made by the United States with the Crow Indians on the 12th June, 1880, for the sale of the western portion of their reservation in Montana Territory.

It will be remembered that in May, 1880, an agreement was entered

into with certain chiefs of the Crow Indians, then present in Washington (subject to the consent of the adult male members of the tribe), for the cession to the United States of a portion of the Crow Reservation, being a strip along the southern boundary thereof, about eighteen miles wide, between the 109th and 110th meridians, containing in all about 1,668,000 acres.

In anticipation of the confirmation by the Indians of this agreement, bills (S. 1760 and H. R. 6228) to accept and ratify the same, and to make the necessary appropriations, were prepared and introduced in both houses at the second session of the Forty-sixth Congress.

Subsequently, the agreement was submitted by the agent to the Indians in council assembled at the Crow Agency, and was confirmed by a majority of the tribe, with the following modifications, viz: Taking for the western boundary of the lands agreed to be ceded, in place of the 109th meridian, a line about ten miles west of the same, reducing the area of the cession about 115,200 acres. This change of boundaries necessitated the preparation of another agreement, which was duly executed by a majority of all the adult male members of the tribe, in conformity with treaty provisions (Article XI of the treaty with Crows, May 7, 1868, 15 Stat., 649), on the 12th June, 1880. In all other respects this latter agreement is identical with that of May 14, 1880.

The portion of the reservation agreed to be ceded is chiefly valuable for its mineral resources, and its occupation has long been desired by the whites. It is believed that the agreement, as it now stands, will fully answer the requirements of the people of Montana; the strip of land which the Crows refused to sell not being considered of any special advantage to the whites, if indeed it is any particular value to the Indians. The total area of the ceded land is about 1,522,800 acres.

I would respectfully recommend that Congress be requested to take early action in this matter. The Indians cannot understand the delay, and in view of the presence already of many whites upon the lands agreed to be relinquished, are impatient to have the agreement carried into effect. Further delay is only calculated to provoke ill feeling, and may possibly lead to unpleasant results.

I will add that H. R. 6228, before referred to, was favorably reported by the House Committee on Indian Affairs, subject to amendment only upon the question of boundaries. (See H. R. Report 216, Forty-sixth Congress, third session.)

Very respectfully, your obedient servant,

H. PRICE,
Commissioner.

The SECRETARY OF THE INTERIOR.

A BILL to accept and ratify the agreement submitted by the Crow Indians of Montana, for the sale of a portion of their reservation in said Territory, and for other purposes, and to make the necessary appropriations for carrying out the same.

Whereas certain individual Indians and heads of families representing a majority of all the adult male members of the Crow tribe of Indians occupying or interested in the Crow Reservation in the Territory of Montana, have agreed upon, executed, and submitted to the Secretary of the Interior an agreement for the sale to the United States of a portion of their said reservation, and for their settlement upon lands in sev- and for other purposes: Therefore,

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That said agreement be, and the same is hereby, accepted, ratified, and confirmed. Said agreement is executed by a majority of all the adult male members of said tribe, in conformity with the provisions of Article XI of the treaty

with the Crow Indians, of May seventh, eighteen hundred and sixty-eight, and is in words and figures as follows, viz:

"We the undersigned individual Indians and heads of families of the Crow tribe of Indians now residing upon the Crow Reservation in the Territory of Montana, do, this twelfth day of June, A. D. eighteen hundred and eighty, hereby agree to dispose of and sell to the Government of the United States, for certain considerations to be hereinafter mentioned, all that part of the present Crow Reservation in the Territory of Montana, described as follows, to wit:

"Beginning in the mid-channel of the Yellowstone River, at a point opposite the mouth of Boulder Creek; thence up the mid-channel of said river to the point where it crosses the southern boundary of Montana T., being the forty-fifth degree of north latitude; thence east along said parallel of latitude to a point where said parallel crosses Clarke's Fork, thence north to a point six miles south of the first standard parallel, being on the township line between townships six and seven south; thence west on said township line to the one hundred and tenth meridian of longitude; thence north along said meridian to a point either west or east of the source of the eastern branch of Boulder Creek; thence down said eastern branch to Boulder Creek; thence down Boulder Creek, to the place of beginning, for the following considerations:

"First. That the Government of the United States cause the agricultural lands remaining in our reservation to be properly surveyed and divided among us, in severalty, in the proportions hereinafter mentioned, and to issue patents to us, respectively, therefor, so soon as the necessary laws are passed by Congress. Allotments, in severalty, of said surveyed lands shall be made as follows:

"To each head of a family not more than one quarter-section, with an additional quantity of grazing land not exceeding one quarter-section.

"To each single person over eighteen years of age not more than one-eighth of a section, with an additional quantity of grazing land not exceeding one-eighth of a section.

"To each orphan child, under eighteen years of age, not more than one-eighth of a section, with an additional quantity of grazing land not exceeding one-eighth of a section; and

"To each other person under eighteen years, or who may be born prior to said allotments, one-eighth of a section, with a like quantity of grazing land.

"All allotments to be made with the advice of our agent, or such other person as the Secretary of the Interior may designate for that purpose upon our selection, heads of families selecting for their minor children, and the agent making the allotment for each orphan child. The title to be acquired by us and by all members of the Crow tribe of Indians, shall not be subject to alienation, lease, or incumbrance, either by voluntary conveyance of the grantee or his heirs, or by the judgment, order, or decree of any court, nor subject to taxation of any character, but shall be and remain inalienable, and not subject to taxation for the period of twenty-five years, and until such time thereafter as the President may see fit to remove the restriction, which shall be incorporated in each patent.

"Second. That in consideration of the cession of territory to be made by us as individual Indians and heads of families of the Crow tribe to the Government of the United States, said government of the United States, in addition to the annuities and sums for provisions and clothing stipulated and provided for in existing treaties and laws, hereby agrees to appropriate annually, for twenty-five years, the sum of thirty thousand dollars, to be expended under the direction of the President, for our benefit, in assisting us to erect houses, to procure seeds, farming implements, and stock, or in cash, as the President may direct.

"Third. That if at any time hereafter we, as a tribe, shall consent to permit cattle to be driven across our reservation or grazed thereon, the Secretary of the Interior shall fix the amount to be paid by parties so desiring to drive or graze cattle; all moneys arising from this source to be paid to us under such rules and regulations as the Secretary of the Interior may prescribe.

"Fourth. That all the existing provisions of May seventh, eighteen hundred and sixty-eight, shall continue in force.

"Done at Crow Agency, Montana T., this twelfth day of June, A. D. eighteen hundred and eighty."

SEC. 2. That the Secretary of the Interior be, and he is hereby, authorized to cause to be surveyed a sufficient quantity of land on the Crow Reservation to secure the settlement in severalty of said Indians as provided in said agreement, and upon the completion of said survey he shall cause allotments of land to be made to each and all of the Indians of said Crow tribe in quantity and character as mentioned and set forth in the agreement above named, and upon the approval of said allotments by the Secretary of the Interior, he shall cause patents to issue to each and every allottee for the lands so allotted, with the same considerations, restrictions, and limitations mentioned therein as are provided in said agreement.

SEC. 3. That for the purpose of carrying the provisions of this act into effect the

following sums, or so much thereof as may be necessary, be, and they are hereby, set aside out of any moneys in the Treasury not otherwise appropriated, to be expended under the direction of the Secretary of the Interior as follows, namely:

For the expense of the survey of the lands as provided in the second section of this act, the sum of fifteen thousand dollars.

For the first of twenty-five installments, as provided in said agreement, to be used by the Secretary of the Interior in such manner as the President may direct, the sum of thirty thousand dollars.

DEPARTMENT OF THE INTERIOR,
Washington, December 16, 1881.

SIR: I return herewith the letter of Hon. John Sherman and accompanying communication from L. S. Wilson and others, of Bozeman, Mont., relative to restoration to the public domain of a portion of the Crow reservation, received by your reference on the 6th instant.

In reply, you are respectfully informed that this day a draft of a bill to ratify an agreement with the Crow Indians for the sale of a portion of their reserve has been presented to Congress for early and favorable consideration, and your attention is invited to that portion of the report of the Commissioner of Indian Affairs, accompanying said bill, urging early action, as the Crows are impatient and delay may lead to unpleasant results.

A copy of the letter from the Commissioner of Indian Affairs, of the 14th instant, returning the papers referred by you, is herewith transmitted.

Very respectfully,

S. J. KIRKWOOD,
Secretary.

Hon. H. L. DAWES,
United States Senate.

SENATE LIBRARY COMMITTEE,
Washington, December 3, 1881.

MY DEAR SIR: While in Montana I was visited by several respectable citizens of Bozeman, who urged the confirmation of a treaty which they said was pending in the Senate in respect to the Crow Reservation. I told them that if they would state the facts in writing I would see that they would be considered by the appropriate committee. I inclose the paper sent me and trust it will have full consideration. It appeared to me from the information I had that their request ought to be complied with.

Very truly yours,

JOHN SHERMAN.

Hon. HENRY L. DAWES,
Chairman of the Committee on Indian Affairs.

Respectfully referred to the honorable Secretary of the Interior for information and advice.

H. L. DAWES.

BOZEMAN, MONT., *November* 1, 1881.

DEAR SIR: The undersigned, by your request, would most respectfully submit the following statement to you and other Senators in relation to the restoration of that portion of the Crow Reservation now embraced within the provision of the treaty now pending, and would say that within the scope of country so sought to be restored is located a number of mining districts.

First in importance so far, and first in location is Emigrant Gulch, discovered in the year 1864, since which time the mines there and in the vicinity have been continuously worked by *bona fide* settlers in good faith. During periods of excitement since its discovery, there have been as many as 300 inhabitants there engaged in working the placers and prospecting in the immediate vicinity. Now we do not think there are more than 100 persons so engaged, yet these are all *bona fide* settlers, and many of them made location prior to the time that said portion of country was set apart as an Indian Reservation. The mines have never been thoroughly and systematically worked for the reason that not having any title to the land and no hope of obtaining it (by reason of its being a reservation) they were deterred from making any substantial improvements, or invest in the necessary machinery to successfully carry on these mining operations.

In addition to the placer mines, there has been discovered numerous quartz lodes that are believed to be rich in both gold and silver, but are undeveloped for reasons

above stated. Many of the miners have their families with them, and their children are deprived of the benefits of public schools, and are unable to send them away for that purpose; yet for this they are not to blame, having settled there and made their little homes prior to the treaty with the Crow Indians. This country, as you know from personal observation, is for the most part a rugged and mountainous country, and can not be made of any value except for the precious metals it contains; that it is not of any value to the Crow tribe of Indians as a reservation; that they never visit it, nor is it suitable for the game upon which the Indians subsist; that no opposition is made by the Crows for the cession of that portion of their reservation, while the demand upon the part of the citizens is urgent and the reasons cogent. We deem it but an act of simple justice that the treaty should be ratified. We could acquire titles to valuable mines; we could pay our taxes; we could build up prosperous communities, could educate our children, and be a source of revenue both to the Territorial and general government. The next mines in importance and date of location are Bear and Crevice Gulches, discovered in 1865 or 1866, and have been mined and worked since discovery by actual settlers. The same reasons for lack of development and successful working have operated in these places as in Emigrant Gulch, yet these are as deserving as the former, and like them only occupy the country and hold what they claim by sufferance of the government; so they too, so long as the Crows are willing and no one injured thereby, want the bill passed now pending in the Lower House to ratify the treaty already made with the Crow tribe of Indians to restore said portion of their reservation to the public domain. These mentioned are only a portion of the mines discovered in this section. There are the Clark's Fork mines and the Boulder mines, but it would be only a repetition, as they all come under the same conditions.

In conclusion we would desire to say that we presume the bill for an act upon this subject is in accordance with a series of resolutions sent to our Delegate in Congress, as also to the Interior Department. If so it only includes the mines spoken of, and is all we seek; and in seeking its ratification we feel conscious of these facts: that the Crows care nothing for this part of their reservation; they never visit it for any purpose, whatever; that (as your own knowledge of the country leads you to believe) it is a rugged and mountainous country; that game is scarce therein, and, as a consequence, of no value to an Indian; hence we cannot see why the passage of this bill should be delayed.

In view of all these facts you will confer a great favor upon many friends here, by giving this matter your favorable and earnest consideration.

Very respectfully, your obedient servants,

LESTER S. WILSON.
GEORGE HUSTON.
T. B. SACKET.
J. V. BOGERT.

Hon. JOHN SHERMAN,
Washington, D. C.

DEPARTMENT OF THE INTERIOR,
OFFICE OF INDIAN AFFAIRS,
Washington, December 14, 1881.

SIR: I am in receipt, by department reference, for report, of a letter from Hon. John Sherman, addressed to Hon. H. L. Dawes, chairman of the Senate Committee on Indian Affairs, dated the 3d instant, inclosing a communication from Lester S. Wilson and others, citizens of Bozeman, Mont., dated the 1st ultimo, urging the speedy confirmation by Congress of the agreement entered into by the United States with the Crow Indians on the 12th June, 1880, for the sale of the western portion of their reservation in Montana Territory.

In reply thereto, I have the honor to invite your attention to my report of this date, transmitting for submission to Congress the draught of a bill to accept and ratify said agreement.

Owing to the pressure of other business, the bills for this purpose which were introduced at the last session were not acted upon, other than by the House Committee, who reported favorably (see H. R. Report No. 216, Forty-sixth Congress, third session).

It is to be hoped that Congress will now take early action in the matter.

The letter of Senator Sherman, with its inclosure, is herewith returned, and a copy of this report is inclosed.

Very respectfully, your obedient servant,

H. PRICE,
Commissioner.

The SECRETARY OF THE INTERIOR.

47TH CONGRESS, 1st Session. } SENATE. { EX. DOC. No. 20.

MESSAGE

FROM THE

PRESIDENT OF THE UNITED STATES,

TRANSMITTING

A report from the Secretary of State, in response to Senate resolution of the 13th of October, 1881, calling for the papers in relation to the seizure of one Vicenzo Rebello, an Italian, in the city of New Orleans, in June, 1881, &c.

DECEMBER 19, 1881.—Read and referred to the Committee on the Judiciary and ordered to be printed.

To the Senate of the United States:

I transmit herewith to the Senate a report from the Secretary of State, in response to its resolution of the 13th of October last, calling for the transmission to the Senate of papers on file in the Department of State relating to the seizure of one Vicenzo Rebello, an Italian, in the city of New Orleans, in June 1881, by one James Mooney, under a warrant of arrest issued by John A. Osborn, United States commissioner in and for the city of New York.

CHESTER A. ARTHUR.

WASHINGTON, *December* 19, 1881.

To the President:

The Secretary of State, to whom was addressed a resolution of the Senate, of the 13th October last, asking the transmission to the Senate of papers on file in the Department of State relating to the seizure of one Vicenzo Rebello, an Italian, in the city of New Orleans, in June, 1881, by one James Mooney, under a warrant of arrest issued by John A. Osborn, United States commissioner in and for the city of New York, &c., has the honor to communicate herewith a copy of the principal papers on file touching the arrest of the person mentioned, or of Giuseppe Esposito, alias Giuseppe Randazzo, understood to be the same individual, and a list of these papers.

Respectfully submitted.

JAMES G. BLAINE.

DEPARTMENT OF STATE,
Washington, December 17, 1881.

List.

Certificate of John A. Osborn, commissioner, dated September 17, 1881, and record of the proceedings had before him "in the matter of the application for the extradition of Giuseppe Esposito, alias Randazzo, under treaty with Italy."

Warrant of arrest of Giuseppe Esposito, alias Randazzo, issued by John A. Osborn, United States commissioner, June 17, 1881, and proceedings in commitment.

Opinion of John A. Osborn, commissioner, in the matter of the application for the extradition of Giuseppe Esposito, alias Randazzo, an alleged fugitive from the justice of the Kingdom of Italy, under date of September 13, 1881.

Affidavits of Antonio Persica, Salvadore Cannino, Nicolo Taranbino, and others, of New Orleans, made in the month of August, 1881.

Certificate of George P. Marsh, Envoy Extraordinary and Minister Plenipotentiary of the United States at Rome, dated March 11, 1881, touching the legality of certain documents attached thereto, included under the head of Exhibit A.

Prince de Camporeale to Mr. Blaine, March 30, 1881.

Prince de Camporeale to Mr. Blaine, September 14, 1881.

United States Commissioner Osborn to Mr. Blaine, September 17, 1881.

Mr. Blaine to Prince de Camporeale, March 31, 1881.

Mr. Hunter to Prince de Camporeale, September 19, 1881.

Before John A. Osborn, commissioner, &c.

In the matter of the application for the extradition of Giuseppe Esposito, alias Randazzo, under treaty with Italy.

I, John A. Osborn, commissioner, duly appointed under Title LXVI, Revised Statutes of the United States, relating to extradition, do hereby certify that the papers hereto annexed contain the record of the proceedings had before me in the above-entitled matter; that the papers in the index called "Complaint, with papers annexed"; "Minutes of Testimony"; "Exhibit A, original;" "Exhibit A, translation"; "Exhibit B, original"; "Exhibit B, translation"; "Exhibit C, original"; "Exhibit C, translation"; together with the "sixteen affidavits" mentioned in index, are the original papers used before me on the several hearings, and the papers called "warrants and commitments" and "final warrant of commitment" are copies of the original isssued by me.

I further certify that the reason for not transmitting a copy of all the testimony taken before me is that sufficient time was not given to enable the copy to be made, if the papers were to be transmitted on or before the 17th instant to the Secretary of State at Washington.

In witness whereof I have hereunto subscribed my name this 17th day of September, A. D. 1881.

JOHN A. OSBORN,
Commissioner, &c.

Before John A. Osborn, esq., United States commissioner, and commissioner duly appointed to act (§ 5270 R. S,. U. S.), southern district of New York.

In the matter of the requisition for the surrender of Giusseppe Esposito otherwise known as Giuseppe Randazzo, a fugitive from justice.

SOUTHERN DISTRICT OF NEW YORK, *ss:*

Camporeale, being duly sworn, deposes and says:

That he is chargé d'affaires *ad interim* of His Majesty the King of Italy accredited to the Government of the United States.

On information and belief the deponent makes complaint against Guiseppe Esposito, otherwise known as Giuseppe Randazzo, and alleges—

(1.) That the said Giuseppe Esposito, otherwise known as Giuseppe Randazzo, did, on or about the 27th day of August, 1876, within the territory and jurisdiction of the Government of His Majesty the King of Italy, commit the crime of robbery by violence upon the person of Vincenzo Fusci.

(2.) That within the like territory and jurisdiction the aforesaid Esposito, alias Randazzo, did, on or about the 4th of November, 1876, commit the crime of robbery upon the person of John Forester Rose, and the crime of attempting to commit murder upon the person of said John Forester Rose.

(3.) That within the like territory and jurisdiction the aforesaid Esposito, alias Randazzo, did, on or about the 20th of March, 1877, commit the crime of murder, with premeditation and by lying in ambush, upon the person of Giuseppe Guccione.

(4.) That the said Esposito, alias Randazzo, did, within the like territory and jurisdiction, on or about the 15th day of May, 1877, commit the crime of robbery, by violence and with aggravating circumstances, upon the person of Antonino Formusa.

(5.) That within the like territory and jurisdiction, and on or about the 2nd of June, 1879, the aforesaid Esposito, alias Randazzo, did commit the crime of murder, with premeditation, upon the person of Santo Esposito.

(6.) That within the like territory and jurisdiction, the aforesaid Esposito, alias Randazzo, committed the crime of robbery by violence, upon the person of Salvatore Sanzone.

The sources of deponent's knowledge, and the grounds of his belief, are the dispatches received from his government, and authenticated copies of the proceedings had to examine into the commission of the aforesaid crimes.

That each and every of the crimes aforesaid are provided for in a treaty or convention for extradition between the Government of the United States and the Government of His Majesty the King of Italy, and concluded at Washington on the 23rd day of March, 1868, and proclaimed on the 30th day of September, 1868.

That the said Esposito, alias Randazzo, has sought asylum and is now to be found within the territory of the United States of America.

That the said Esposito, alias Randazzo, has been charged with each and every of the crimes above specified; that warrants for his arrest have been issued in the Kingdom of Italy, the country where the crimes were committed, upon said charges, and duly authenticated copies of such warrants of arrest are annexed to this complaint, and marked A and B.

CAMPOREALE,
Chargé d'Affaires of Italy.

Subscribed and sworn to this 15th day of June, 1881, before me.

JOHN A. OSBORN,
U. S. Comm'r, Commissioner duly authenticated to act under § 5270 U. S. Revised Statutes.

The President of the United States of America to any marshal of the United States, to the deputies of any such marshal, or any or either of them, to any sheriff, constable, or other officer in any State, District, or Territory, within the jurisdiction of the United States; to James Mooney:

Whereas, under the convention for extradition between the United States of America and His Majesty the King of Italy, which was concluded at Washington on the 23d day of March, 1868, ratifications whereof were duly exchanged between the contracting parties, which was proclaimed on the 30th day of September, 1868, and which still remains in full force and virtue, requisition has been duly made by the diplomatic agent of His Majesty the King of Italy for the surrender of Giuseppe Esposito, otherwise known as Giuseppe Randazzo, a fugitive from justice, charged with the commission of crimes provided for by said convention, which crimes are alleged to have been committed within the territory and jurisdiction of the Kingdom of Italy, since the conclusion, ratification, and proclamation of said treaty.

Whereas, upon such requisition and upon presentation of duly authenticated copies of warrants for the arrest of the said Giuseppe Esposito, otherwise known as Giuseppe Randazzo, in Italy, where the said crimes were committed, the President of the United States did, in accordance with the terms of the convention aforesaid, issue a warrant for the apprehension of the said fugitive in order that he might be brought before the proper judicial authority for examination.

Whereas, under the Revised Statutes of United States, title Extradition, sections 5270 and following, complaint under oath has been made to John A. Osborn, esquire, a commissioner of the United States, authorized by the circuit court of the United States to issue warrants for the apprehension of persons charged with the commission of crime under any treaty or convention for extradition, charging Giuseppe Esposito, otherwise known as Giuseppe Randazzo, aforementioned, with having committed within the territory and jurisdiction of the Government of His Majesty the King of Italy the crimes of robbery, attempt at murder, and murder, all of which crimes are provided for by the convention aforesaid; and

Whereas, the person so charged has sought asylum and is now to be found within the limits of the territory and jurisdiction of the United States of America:

Now, therefore, you are and each of you is hereby commanded to apprehend the aforesaid Giuseppe Esposito, otherwise known as Giuseppe Randazzo, and bring him before the aforesaid commissioner of the United States, John A. Osborn, esquire, to the

end that the evidence of his criminality may be heard and considered, and if deemed sufficient to sustain the charges made against him, under the provisions of the aforesaid convention, that the same may be certified, together with a copy of all the testimony taken before him, to the Secretary of State, that a warrant may issue for his surrender according to the stipulations of the convention aforesaid.

Witness the hand and seal of office of the commissioner aforesaid at the city of New York, in the southern district of New York, the 17th day of June, 1881.

[SEAL.] JOHN A. OSBORN,
United States Commissioner and Commissioner duly authorized to act under section 5270 United States Revised Statutes.

Commitment.

The President of the United States of America to the marshal of the United States for the southern district of New York, and to his deputies or any or either of them:

Whereas one Giuseppe Esposito, alias Randazzo, has been arrested by James Mooney upon a warrant issued by the undersigned commissioner, and hereto annexed, and the said accused having been brought before me upon said warrant, and for the purpose of securing the body of the said Giuseppe Esposito, pending an investigation of the charges of murder, attempted murder, and robbery alleged to have been committed in the Kingdom of Italy, with which the said accused stands charged, as is more fully set forth in the warrant hereto annexed, I hereby command that you apprehend the said Giuseppe Esposito, alias Randazzo, now in the southern district of New York, and him safely keep that he may be dealt with according to law for the said offences.

Given my hand and seal this 12th day of July, A. D. 1881.

[L. S.] JOHN A. OSBORN,
Commissioner, duly authorized to act under § 5270 U. S. Rev. Stat.

Commitment.

The accused is remanded into the custody of the U. S. marshal for examination on Wednesday, July 13th, 1881, at 1 p. m., the adjournment being granted at the request of counsel for accused.

July 12th, 1881.

JOHN A. OSBORN,
Commissioner.

Commitment.

HENRY KNOX, esquire,
United States marshal in and for the southern district of New York:

Whereas the said Giuseppe Esposito, alias Randazzo, now under arrest by virtue of a warrant issued by the undersigned, charged with the crimes of murder, attempt to commit murder, and robbery in the Kingdom of Italy, and the examination of said charges is now pending and undetermined before me, and good and substantial reasons having been given by the counsel for the Italian Government for an adjournment, I hereby remand the accused to your custody, and hereby command you him safely keep until Monday, the 18th day of July, at the hour of one o'clock p. m. of that day, at which time you will then have the said accused before me for further examination.

N. Y., July 13, 1881.

JOHN A. OSBORN,
Commissioner.

Commitment.

HENRY E. KNOX, Esqr.,
United States marshal in and for the southern district of New York:

Whereas the said Giuseppe Esposito, alias Randazzo, now under arrest by virtue of a warrant issued by the undersigned commissioner, charged with the crime of murder and robbery in the Kingdom of Italy, as is more set forth in the warrant of apprehen-

sion hereto annexed, and the examination of the charges is now pending and undetermined before me, and good and reasonable grounds have been shown by the counsel for the Italian Government for an adjournment, I hereby remand the accused to your custody, and hereby command you him safely keep until Monday, August 8th, 1881, at the hour of one o'clock p. m. of that day, at which time you will then and there have the said accused before me for further examination.

July 18th, 1881.

JOHN A. OSBORN,
Commissioner specially appointed to execute provisions of title 66, U. S. R. S.

Commitment.

By written consent of counsel for respective parties I hereby adjourn the further examination of the within-named accused to August 11th, 1881, at 2 p. m., at which time have the body of said Giuseppe Esposito, alias Randazzo, before me for further examination.

Aug. 8th, 1881.

JOHN A. OSBORN,
Commissioner, &c.

Commitment.

The accused before me, and the counsel for respective partieshaving agreed to an adjournment to Saturday, August 13th, 1881, at 10.30 a. m., you are hereby commanded to take into your custody the within-named accused, and him safely keep, and have him before me on Saturday next at 10.30 a. m.

Aug. 11th, 1881.

JOHN A. OSBORN,
Commiss'r.

HENRY E. KNOX, Esq.,
U. S. Marshal.

Commitment.

To HENRY E. KNOX, Esqr.,
U. S. Marshal, Southern District of New York:

The examination of the charges against Giuseppe Esposito alias Randazzo, being not yet terminated, I hereby remand the accused to the custody of the U. S. Marshal, to be by him held until Tuesday, August 16th, 1881, at 1 P. M.

August 13th, 1881.

JOHN A. OSBORN,
Commissioner.

Commitment.

The examination of the charges against Giuseppe Esposito alias Randazzo being still pending, and the counsel for the respective parties having consented to an adjournment until the 30th of August, at 1 p. m., I hereby remand the accused to the custody of the U. S. Marshal.

Aug. 16, 1881.

JOHN A. OSBORN,
Commr.

Commitment.

The examination of the charges against Giuseppe Esposito alias Randazzo, being still unfinished, I hereby remand him to the custody of the United States Marshal, to be by him held until Wednesday the 31st day of August, 1881, at 2 o'clock, at which time the marshal will have been before me for further examination.

Aug. 30th, 1881.

JOHN A. OSBORN,
Commissioner.

To HENRY E. KNOX, Esq.,
U. S. Marshal.

Commitment.

The further examination adjourned to Monday. September 5th, 1881, at 2 p. m., and the accused is hereby remanded to the custody of the U. S. Marshal.
Aug. 31st, 1881.

JOHN A. OSBORN,
Commissioner.

Commitment.

By consent of counsel for respective parties the examination is adjourned to Tuesday, September 6th, 1881, at 2 p. m.

JOHN A. OSBORN,
Commissioner, &c.

Commitment.

Further proceedings adjourned to Sept. 7th, 1881, at 2 p. m., and the accused meanwhile is hereby remanded to the custody of the marshal.
Sept. 6, 1881.

JOHN A. OSBORN,
Commissioner.

To HENRY E. KNOX, esq.,
U. S. Marshal.

Commitment.

The proceedings further adjournment to Friday, September 9th, 1881, at 1½ p. m., and the accused is hereby remanded to the custody of the marshal.

JOHN A. OSBORN,
Commissioner.

To HENRY E. KNOX,

Commitment.

Examination still pending and adjourned to September 14th, 1881, at 2 p. m., and the accused remanded to the custody of the marshal meanwhile.
Sept. 9, 1881.

JOHN A. OSBORN,
Commissioner, &c.

To HENRY E. KNOX,
U. S. Marshal.

In the matter of the application for the extradition of Giuseppe Esposito, alias Randazzo, charged with the crimes of murder and robbery in the Kingdom of Italy, now a fugitive from justice.

To HENRY E. KNOX, Esq.,
United States Marshal for the Southern District of New York:

Whereas, one Giuseppe Esposito, alias Randazzo, now in your custody, under and by virtue of a warrant issued by the undersigned commissioner, charged with divers crimes therein mentioned, and whereas the evidence of criminality having been heard and considered pursuant to Article I, of the treaty between the United States and Italy, and section 5270 of the Revised Statutes of the United States by said commissioner, and deeming the evidence of criminality sufficient to sustain the charge of an attempt to commit murder upon the person of John Forrester Rose, and of the crime of murder of Giuseppe Guccione, at the time and places set forth in the complaint and warrant of apprehension, I hereby commit the said Giuseppe Esposito, alias Randazzo, to your custody, to be by you held or imprisoned in the proper jail and there to remain until a warrant may issue, upon the requsition of the proper authorities of the government

of Italy for the surrender of said Giuseppe Esposito, alias Randazzo, according to the stipulations of said treaty, for the said crimes of attempt of murder upon the person of J. Forrester Rose, and for the murder of Giuseppe Guccione.

The five charges set forth in the complaint and warrant of apprehension are not sustained by the evidence of criminality, and I hereby decline to commit the accused for such alleged offenses.

In witness whereof I hereby subscribe my name and affix my seal this 14th of September, A. D. 1881.

[L. S.] JOHN. A. OSBORN,
Commissioner, duly appointed and authorized to act under Section 5270 of United States Revised Statutes.

Warrant of surrender issued Sept. 19, 1881.

WM. HUNTER,
Actg. Secretary.

Opinion of John A. Oslorn, Commissioner.

In the matter of the application for the extradition of Giuseppe Esposito, alias Randazzo, an alleged fugitive from justice from the Kingdom of Italy.

There are no legal questions involved in the consideration of this case, other than the motion for the transfer of the hearing before some judge or commissioner at New Orleans, the place where the accused was arrested, to determine the problem of identity, should I feel constrained to hold the accused for extradition on the evidence submitted here.

I believe that all the requirements of article 5 of the Treaty with Italy, and the statutory provisions relating to extradition proceedings, contained in Chapter LXVI, Revised Statutes of the United States, as well as the rules prescribed for the conduct of proceedings under extradition Treaties, laid down in the concluding part of the case *In re* Heurich (5 Blatchf. 425) have been complied with.

The complaint charges seven specific offenses as having been committed by Giuseppe Esposito, alias Randazzo, in the jurisdiction of the Kingdom of Italy, as follows:

1st. On or about August 22d, 1876, the crime of robbery by violence, upon the person of Vincenzo Fusci.

2nd. On or about the 4th November, 1876, the crimes of robbery, and of attempting to commit murder upon the person of John Forrester Rosé.

3rd. On or about the 20th of March, 1877, the crime of murder of Giuseppe Guccione.

4th. On or about the 15th of May, 1877, the crime of robbery, upon the person of Antonino Forumsa.

5th. On or about the 2d of June, 1879, the crime of murder, upon the person of Santo Esposito.

6th. (No date mentioned), the crime of robbery, upon the person of Salvatore Sanzone.

A careful and exacting analysis of the evidence offered in support of these several offenses, upon the authenticated papers produced, convinces me that there is no legal proof to sustain five of the seven charges mentioned in the complaint and warrant, and I therefore dismiss all the accusations therein set forth, save and except the charge of the attempt to commit murder upon the person of J. Forrester Rose, contained in the 2d count, as it were, of the complaint, and the charge of murder of Giuseppe Guccione, contained in the 3d count of the complaint.

The evidence in support of the attempt to commit murder upon the person of J. Forrester Rose is of that nature and character that would justify the holding of the person for trial if the offense had been committed in this country. (Article I of the treaty.)

The deposition of Nicholas Nicolosi, made Feb'y 21st, 1881, states that the witness, in company with John Forrester Rose and his brother George, merchants, and the chief accountant of the firm of Gardner, Rose & Co., went, on Nov. 4th, 1876, from Palermo to Lercara, by railroad, and after arriving at the latter place proceeded in carriage and on horseback in the direction of certain mines in which they were interested.

It describes the mounting of horses at Lercara, and the capture of J. Forrester Rose by 4 bandits outside of Lercara, and describes one of the bandits who led the mare which J. Forrester Rose was compelled to ride; it describes Rose's attempt to escape, and the firing at him with a gun by the bandit who led his horse, and the approva of the firing by the leader of the band. The leader is described as being "about 35 years of age, stature rather short, size regular, eyes lively, nose rather small, complexion brown, mustache dark brown, but ends of it lighter."

On Nov. 4, 1876, the police of Lercara made a report to the attorney of the King, to

the effect that 4 unknown brigands had captured J. Forrester Rose and his attendants that day.

There is also a copy of official report of the major of Rocapalamba and others in authority in the municipality of Alia, dated July 9, 1877, of the surrender of Giuseppe Esposito, *alias* Randazzo, to them; also, copy official report of under, lieutenant of Royal Carbineers, and two aldermen of Alia, dated July 10th, 1877, which relates to the inducements held out for the surrender of Esposito, and his surrender thereunder.

On October 2d, 1877, under verbal process of identification in the tribunal of Termini, the witness, Nicolas Nicolosi, identifies one Giuseppi Esposito, *alias* Randazzo, in jail, as one of the four persons who captured John Forrester Rose, and being precisely the man who fired a gun at him when Rose was attempting to escape across the fields.

On Oct. 6th, 1877, the same witness was called upon again to identifiy the said Giuseppe Esposito, *alias* Randazzo, in jail, and reaffirms his statement of Oct. 2, 1877.

I deem this evidence sufficient to sustain the charge of attempting to commit the crime of murder upon the person of J. Forrester Rose.

Let it be borne in mind that this attempt of murder took place on Nov. 4th, 1876, and a certain Giuseppe Esposito, *alias* Randazzo, was on October 2d and 6th, 1877, identified by the witness Nicolas Nicolosi, as being one of the four brigands who made the capture and fired the gun at Mr. Rose.

There is no evidence on the part of the accused, nor is there any proof in the case, that tends to subvert or disturb the probative force of the testimony of Nicolosi.

I now come to the charge of the murder of Giuseppe Guccione. I find in the authenticated papers marked Exhibit A a document denominated "Copy of information of Royal Carbineers of Alia," dated March 22d, 1877, to the effect that Giuseppe Guccione was killed "by three unknown individuals armed with double-barreled guns, afoot, and faces covered with hoods," one described as "low of stature, stout, very long mustache, and short beard on his chin."

This document is not evidence, because it is of a hearsay nature, based upon report, and rumors. I therefore exclude this from my consideration as being incompetent evidence. There is a report of a *post-mortem* examination of Giuseppe Guccione, dated March 21, 1877, which is clearly competent proof of the death of said Giuseppe Guccione.

On Feb'y 20, 1881, Giuseppe Guccione, son of Antonini, made a revelation of what he saw and heard and knew concerning the shooting and death of his uncle, Giuseppe Guccione, which took place on the 20th day of March, 1877. He states, under oath, that his recognition of one Giuseppe Esposito, *alias* Randazzo, and Pietro Rumfola, two of the three persons who murdered his uncle, is as follows:

"I had left the vineyard in Portella del Lupo, where my father and my uncle were occupied in dressing the vines. My father and my uncle ordered that I should assemble the animals, which were pasturing at some distance, and saddle them in order to return home. As I followed the path where I had left the saddle, I encountered Randazzo, sitting near it, who had shaved off his mustaches and beard on his chin. I asked him what he was doing there, and he answered something, and as he spoke he held his double-barrel gun in position to fire."

Omitting some unimportant statements of the witness, he continued:

"As soon as I noticed the said Randazzo armed, I returned to give intelligence to my uncle; when I perceived beside the said Randazzo two other individuals, likewise armed with double-barreled guns, and one of whom seemed to be Pietro Rumfola. They approached my uncle and my father at the distance of half a gun-shot, and Randazzo, addressing my uncle, said that he might consider himself already captured. Whereupon my uncle said, 'O traitors! how you treat me! Do you not remember the good I did you?' After that utterance Randazzo first fired his gun, and was quickly followed by two shots from Rumfola's gun."

This testimony is corroborated by the deposition of Gucciono Antonino, brother of the murdered Giuseppe, in almost the same language.

There can be no doubt of the killing of Giuseppe Guccione upon the evidence adduced, and that one Giuseppe Esposito, *alias* Randazzo, was one of the muderers. I therefore conclude that the *corpus delicti* has been satisfactorily proved, and that one Giuseppe Esposito, *alias* Randazzo, is one of the offenders.

Now, the next subject of enquiry is, who is the man here in custody charged with these offenses? Is he the Randazzo who aided in the capture or abduction of J. Forrester Rose, and who fired a gun-shot at him, as testified to by the witness Nicolas Nicolosi? Is this man here the Randazzo who, with Pietro Rumfola, shot and killed Giuseppe Guccione, and who with 19 others was put upon trial for offenses at Palermo in Sept., 1878, and who escaped from the prison van before the conclusion of the said judicial proceedings?

It is proclaimed by the counsel for the Italian Government that the Randazzo sought for, and whose extradition is demanded, is the Giuseppe Esposito, *alias* Randazzo, who was on trial in Palermo, and who escaped from the custody of the court on the 5th day of September, 1878.

It is claimed by the prosecution that Randazzo is the same Randazzo who abducted and attempted to commit murder upon the person of J. Forrester Rose, and who, with two others, murdered Giuseppe Guccione, and who was recognized by Nicolas Nicolosi as Giuseppe Esposito, *alias* Randazzo, who fired the gun-shot at Mr. Rose, and who also was recognized by Giuseppe Guccione, nephew of the deceased Giuseppe, and by Guccione Antonino, as the Giuseppe Esposito *alias* Randazzo, who was one of the three men who killed *the* Giuseppe Guccione in his own vineyard.

I have already recited the description of Randazzo, as given by Nicolas Nicolosi, it being the only description among the papers in Exhibit A which I deem competent proof. There is a description of Randazzo being shot in the leg, and being lame, but the document containing that statement is not legal evidence in the case, and cannot be considered such proof as is required by Article I of the treaty, and, furthermore, I have not treated it as evidence. I deem the document heresay and incompetent as proof, and in the same light as the papers offered in support of the five charges which I have heretofore decided as not being sustained by competent evidence.

Now let us see what the prosecution has introduced as proof of the identity of the accused:

1st. The description given by Nicolas Nicolosi.

2nd. A photograph or likeness which is certified to by five witnesses, viz, Gustavo Randeri, chief of the prison juard at Palermo, who says it is extremely like a man "once imprisoned in this jail, namely, Esposito Giuseppe, a son of unknown parents, otherwise known as Randazzo, born in Alia, and who was 30 years of age in 1877."

Luigi Maron, lieutenant of the guards in the great prison of Palermo, who says it is "a very good likeness of Giuseppe Esposito, known as Randazzo, whom I knew when he was at the time incarcerated in the great prison under my charge, in the first tier of convicts."

R. Deltufo Gaetano, officer of the prison guard at Palermo, who says: "I recognize in the figure the portrait of Giuseppe Randazzo, son of unknown parents, and who was incarcerated in the great prison of Palermo, under my surveillance, and I readily recognize him, both by his physiognomy and his stature."

Rosario Guaruaschelli, vice-chancellor, attached to the court of appeals and discharging the duties of the court of assizes, who says: "I very easily recognize the potrait of Giuseppe Esposito, known as Randazzo, which is the one with a fine beard upon the face."

Varvaro Lorenzo, police agent on duty in the court of assize, who says: "I recognize it as a most excellent likeness of the brigand Randazzo Giuseppe, who about two years ago escaped from the prison van while being taken to the court of assize for trial."

3d. The prosecution have put on the witness-stand De Pietro Zopito, a carabineer or guard of police, who belongs to the Italian army, and who saw the accused for 9 days in the barracks at Alia, in July, 1878 (he evidently means 1877), who took care of him in prison, brought him his meals, and accompanied him everywhere he would go (to use his own language), and saw him in Alia a month or month and a half before he took him to prison, and saw him likewise 5 or 6 times during two months in 1871, superintending the laborers working in the fields belonging to Giuseppe Occione, mayor of Alia, and who identified him here without any equivocation.

4th. The witness Giuseppe Dora, a carabineer, since 1874, and belongs to the Italian army, testified on the stand that he saw "the accused in barracks in Palermo, and by reason of its being rumored that he was the celebrated bandit Esposito, he received a strong impression of him. He asked him if his name was Randazzo, and he replied yes."

This witness recognized the accused as being the Randazzo he saw in the barracks of Palermo. He identified him here, and on cross-examination his testimony is not shaken to any extent that I can perceive. I make the same observation in regard to the testimony of the witness Zopito.

In opposition to these witnesses the defense offers the testimony of John Watson, who was second steward of the steamer City of New Orleans, and states that he knew the accused in New Orleans as "Dago John" for three or four years; saw him about the fruit market, and bought fruit of him several times. Also the witnesses Antonio Angelo, commission merchant; Antonio Pollegrino, in fruit business; Giuseppe Provengano, fruit dealer; Rocco Gerachi, 'longshoreman; Messina Salvatore, seaman on river boats; all of New Orleans, the substance of whose testimony is that they saw and knew the prisoner there as a fruit vender, by the name of Constanso, and saw him there as early as May and June, 1878.

None of these witnesses were intimate with the said Constanso, nor did they as fruit dealers have any business transactions with him, nor did they know his residence—simply a casual acquaintance. The witness Salvatore carried fruit for the accused on his boat, but it was after the epidemic, and within the last two years.

The object and purpose of this testimony is to assail the proof of the prosecution so

far as to show that the prisoner was not in Palermo in September, 1878, and therefore the Randazzo who escaped was not this man.

Sara Constanso, the wife of the accused, also testifies she knew her husband in the summer of 1878, before the epidemic, and as an evidence of her intimate relations with him for at least the last 19 months, she produced a baby ten months old in court, which might be considered an exhibit in the case, and which she swears is his child.

Finanzo Mondini is called as a witness, who testifies that he saw the Randazzo, who was being tried in Palermo, several times in court, and that he was "two fingers taller than this man; had a perpendicular scar on his forehead, longer beard, and was lame." He further says that the prisoner here is not that Randazzo. But what did he say to the witness Maurice in regard to the identification of this man before he testified in court? He said nothing about a conspicuous scar, nor did he mention it to Mr. Fuller nor to Mr. Knox. His description to Mr. Knox of the Randazzo he saw at Palermo answered so strikingly to the peculiarities of the prisoner, which Mr. Knox had observed, that he (Knox) remarked to Mr. Maurice that the accused must be the right man. This description was given to Mr. Knox before Mondini had seen the prisoner. Mondini's testimony is of the same type and character as that of the two carabineers. It is an impression formed through the instrumentality of sight, which is now reproduced through the medium of the memory. The proper administration of justice and due observance of the established rules of evidence clearly recognize the fact that where the direct testimony of a witness has been taken, and its material force diminished by a pertinent cross-examination, and by other witnesses whose evidence is contradictory of some of its salient points, his testimony as a whole, when compared with others of a like nature and kind, and which has not been attacked nor weakened by cross-examination, must be deemed less creditable and consequently less reliable. If the photograph in evidence is the likeness of the accused—and I must assume that it is, by reason of its striking resemblance to the prisoner, and no proof to the contrary having been offered by the defence—then the testimony of the five witnesses at Palermo who recognized it as being the likeness of the Randazzo is direct and not circumstantial, although the production of the photograph is regarded as a circumstance in determining the question of identity. Now the prosecution has presented two witnesses in court who have recognized the accused as the Randazzo they saw 1877, before and after his surrender; five witnesses who declare the photograph to be a good likeness of the Randazzo who escaped as aforesaid.

No portion of this evidence has been directly assailed, but the force and effect of which is sought to be impaired by the testimony of the seven witnesses from New Orleans, including the wife of the prisoner, by way of exculpatory evidence, tending to avoid the criminative facts proved in regard to the place where the accused was believed to be on the 5th of September, 1878. What I mean to say is, the defense has sought to show that the witnesses on the part of the prosecution are probably mistaken, because of the fact, if it be a fact, that this man was in New Orleans in the summer of 1878, and not in Palermo.

This evidence is in the nature of alibi testimony, and I am free to say that without this evidence there is no trustworthy testimony on the part of the defence which would justify a moment's hesitancy upon the facts and circumstances in this case in arriving at the conclusion that this prisoner is the Giuseppe Esposito, *alias* Randazzo, who escaped from the prison van in Palermo, on the 5th day of September, 1878.

Among the authenticated papers called Exhibit B, which the prosecution introduced at the beginning of this investigation, there is the name of Giuseppe Esposito, *alias* Randazzo, whose age is mentioned as being forty-six years, and who is charged with having committed crimes in 1879. I allude to this fact merely for the purpose of showing that the Randazzo charged with crimes in 1879 was of the same name as the Randazzo in question, but a different age, and it is claimed by the counsel for the defence that he is described therein as being lame. As I have been asked by the proscription not to consider this document Exhibit B, it seeming to relate solely to offences alleged to have been committed in 1879, I do not feel at liberty to give my views upon the inference to be drawn by this discrepancy.

It is frequently asserted that a defence of an alibi is viewed with peculiar suspicion and distrust, more perhaps by reason of the abuse to which it is liable, growing out of the case with which it may be fabricated and sustained by false testimony. The prisoner stands mute in this judicial investigation. A statute of the United States shields him against any prejudice which might be engendered by reason of his silence. He has deemed it wise, however, to offer evidence of some of his acquaintances who knew him in New Orleans.

It is conceded that he was a resident of New Orleans at the time of his arrest, yet whether the testimony of his witnesses fixing the time when they say they first knew him is to overthrow the testimony of witnesses on the part of the prosecution on that point is an issue for me to determine.

The witnesses for the accused may be mistaken as to the fundamental particular of time. Time is always a fruitful source of erroneous impressions. Men neither note nor

measure time with much precision in connection with any occurrence they may incidentally witness, particularly when it does not concern their own affairs.

Alibi evidence is always received with uncommon caution. (Burrill on Circumstantial Evidence.) I do not consider this question of identity as depending upon the preponderance of proof as to numbers of witnesses on either side, but upon the substantive elements, which are considered the groundwork of reliability in human testimony. I must either believe that the evidence supporting the theory that this prisoner was in New Orleans in the summer of 1878, or believe that he is the Giuseppe Esposito who was in Palermo on the 5th day of September, 1878. As the accused has offered a defence, I think I am justified in saying, why did *he* not present proof here *aliunde* as to when he came to this country, by what means of transportation, who was the captain of the vessel, at what port did he arrive, who knew him here immediately after his coming, or some voucher of his being here prior to September, 1878?

It is not in evidence when he made New Orleans his home. It is stated by the witnesses that they first saw him there two or three months before the epidemic during the summer of 1878. Now, upon the question of identity, where a *prima facie* case is made out, the accused should be called upon to produce such evidence as it is in his power to show, who he is and where he was at a certain time. There is still a mystery as to who this man is if he is not Giuseppe Esposito, *alias* Randazzo, because when he was arraigned he gave his name as Rebello, and married and did business under the name of Constanzo. He has not, through his counsel, offered any explanation of the reason for these two names, nor when it was that he first became an inhabitant of this country.

I believe I am extending to this man the justice which the merits of his defence deserve; that to the best of my ability I am administering the laws of my country, and carrying out its treaty stipulations with the Kingdom of Italy; that I have before my eyes at the same time the danger of being led into error by human testimony where the issue is one of personal identity; that I am using the best jugement I am capable of forming, which experience and a careful study of the rules of evidence have tended to enlighten and mature. And in connection with these motives I believe, conscientiously believe, looking at this case in all its certain and doubtful features, that this prisoner is the Giuseppe Esposito, *alias* Randazzo, upon whom the Italian Government charges with offences committed within its jurisdiction, and now claim him as a fugitive from justice.

On the motion made by the counsel for the prisoner for an order or notice to the Italian representative to take proceedings in New Orleans in case I deemed the evidence sufficient to sustain the charges or any of them mentioned in the complaint, and that there should be sufficient evidence of identity in my opinion to justify the holding of the accused for extradition, I have been unable to see my way clear on the question of power as a committing or examining magistrate to direct such a proceeding. If the power be inherent in the commissioner under and by virtue of section 5270 of the Revised Statutes of the United States, which creates the office and confers jurisdiction, then a judicial discretion may be exercised, for a good cause shown, for such a disposition of the matter as the motion calls for; there certainly is no statutory provision regulating any such practice, nor is there any precedent found in the books. I do not see any more injustice in hearing this case in New York than if a citizen of the United States should be arrested in Italy and his identification should become an issue, and the court there should deny an application to have the investigation as to his identity transferred to the United States among his neighbors and friends to show and prove who he is. I might multiply illustrations of this character in legal jurisprudence, but do not deem it necessary for the purposes of this proceeding. This investigation is not a trial of the accused. He will have an opportunity to claim protection in the tribunals of his own country if he be an innocent man and has been unjustly dealt with here. I deny the motion of the counsel both for the want of power to grant it, and for the want of good cause shown, if I had the power which would justify a judicial discretion, for a change of venue, for a further hearing, on the question of identity, and I hereby direct the United States marshal for this district to take the accused into his custody and him safely keep until a warrant of surrender shall be issued by the President of the United States, or he shall be otherwise dealt with according to law.

Coudert Bros. for prosecution.

Dr. Ullo, Wm. D. Shipman, Wm. G. Choate, for the prisoner.

N. Y., Sept. 13th, 1881.

United States of America.

Eastern District of Louisiana:

Personally appeared before me, the undersigned, U. S. Commissioner, Antonio Persica, of the city of New Orleans and State of Louisiana, who, being duly sworn, deposes and says that he is master and owner of a sailing lugger engaged in the carrying trade

on the Mississippi River and tributaries; that he is well acquainted with Antonino Castanza, who was recently arrested in the city of New Orleans, and who gave the name of Vincenzo Ribello upon his arrival in the city of New York; that he has known him some months before the yellow fever in 1878, and that during that period he was engaged in business as a fruit dealer.

his
ANTONIO × PERSICA.
mark.

Witness:
GEO. P. DAVIS.
ANTONIO PILLIGRINÈ.

Sworn to and subscribed before me at New Orleans, Louisiana, this the 24th day of August, 1881.

[SEAL.] JOSEPH A. QUINTERO,
U. S. Commissioner.

UNITED STATES OF AMERICA,
Eastern District of Louisiana:

Personally appeared before me, the undersigned, U. S. Commissioner, Salvadore Cannino, of the city of New Orleans and the State of Louisiana, who, being duly sworn, deposes and says that he is engaged in business in the city of New Orleans as a tailor; that he is well acquainted with Antonino Castanzo, who was recently arrested in the city of New Orleans, and who on his arrival in the city of New York gave his name as Vincenzo Ribello, and that he has known him since 1878, and before the fever epidemic of that year, and that he was during that period engaged in the fruit business.

SALVATORE CANNINO.

Sworn to and subscribed before me at New Orleans, Louisiana, this the 24th day of August, 1881.

[SEAL.] JOSEPH A. QUINTERO
U. S. Commissioner.

UNITED STATES OF AMERICA,
Eastern District of Louisiana:

Personally appeared before me, the undersigned, U. S. Commissioner, Nicolo Taranbino, of the city of New Orleans and State of Louisiana, who, being duly sworn, deposes and says that he is employed in the city of New Orleans, where he resides; that he is well acquainted with Antonino Costanzo, who was recently arrested in the city of New Orleans and taken to New York City, and who, on his arrival there, gave his name as Vincenzo Ribello; that he has known him since the yellow fever epidemic of 1878, and that he was during that period engaged in the fruit business at New Orleans.

NICOLO TARANBINO.

Sworn to and subscribed before me at New Orleans, Louisiana, this the 24th day of August, 1881

[SEAL.] JOSEPH A. QUINTERO,
U. S. Commissioner.

UNITED STATES OF AMERICA,
Eastern District of Louisiana:

Personally appeared before me, the undersigned, U. S. Commissioner, John Caruso, of the city of New Orleans and State of Louisiana, who, being duly sworn, deposes and says that he is engaged in the fruit business in the city of New Orleans, where he resides; that he is well acquainted with Antonino Costanzo, who was recently arrested in New Orleans, and who, upon his arrival in the city of New York, gave his name as Vincenzo Ribello; that he has known him about two months before the yellow fever epidemic of 1878, and that he has had business transactions with the said Costanzo during the period, connected with that fruit trade of New Orleans.

JOHN CARUSO.

Sworn to and subscribed before me at New Orleans, Louisiana, this the 24th day of August, 1881.

[SEAL.] JOSEPH A. QUINTORA,
U. S. Commissioner.

UNITED STATES OF AMERICA,
Eastern District of Louisiana:

Personally appeared before me, the undersigned, U. S. Commissioner, Salvador Milano, of the city of New Orleans and State of Louisiana, who, being duly sworn, deposes and says that he is engaged in the fruit business in said city of New Orleans; that he is well acquainted with Antonino Costanzo, who was recently arrested in the city of New Orleans, and upon whose arrival in the city of New York gave his name as Vin-

cenzo Ribello; that he has known him since the yellow fever times in 1878, and that during that time he was engaged in the fruit business at New Orleans.

SALVADOR MILANO.

Sworn to and subscribed before me at New Orleans, Louisiana, this the 24th day of August, 1881.

[SEAL.] JOSEPH A. QUINTERO,
U. S. Commissioner.

UNITED STATES OF AMERICA,
Eastern District of Louisiana:

Personally appeared before me, the undersigned, U. S. Commissioner, Christanzo Chimento, of the city of New Orleans and State of Louisiana, who, being duly sworn, deposes and says that he is engaged in the shoe business in the city of New Orleans, and that he is well acquainted with Antonino Castanzo, who was recently arrested in the city of New Orleans, and who upon his arrival in the city of New York gave his name as Vincenzo Ribello; that he has known him since before the yellow fever epidemic of 1878, and that during that period he was engaged in the fruit business.

CHRISTANZO CHIMENTO.

Sworn to and subscribed before me at New Orleans, Louisiana, this the 24th day of August, 1881.

[SEAL.] JOSEPH A. QUINTERO,
U. S. Commissioner.

UNITED STATES OF AMERICA,
Eastern District of Louisiana:

Personally appeared before me, the undersigned, U. S. Commissioner, Giuseippe Pizzo, of the city of New Orleans and State of Louisiana, who, being duly sworn, deposes and says that he is engaged in the fruit business in the city of New Orleans, and that he is well acquainted with Antonino Costanzo, who was recently arrested in the city of New Orleans, and who upon his arrival in the city of New York gave the name of Vincenzo Ribello; that he has known him since the year 1878, and that during that period he was engaged at New Orleans and vicinity in the fruit business.

GIUSIEPPE PIZZO.

Sworn to and subscribed before me at New Orleans, Louisiana, this the 24th, day of August, 1881.

[SEAL.] JOSEPH A. QUINTERO,
U. S. Commissioner.

UNITED STATES OF AMERICA,
Eastern District of Louisiana:

Personally appeared before me, the undersigned, U. S. Commissioner, Filippo Chimenti, of the city of New Orleans and State of Louisiana, who being duly sworn deposes and says that he is engaged in business in the city of New Orleans as a merchant, dealing in shoes; that he is well acquainted with Antonino Castanzo, who was recently arrested in the city of New Orleans, and who on his arrival in New York gave his name as Vincenzo Ribello; that he has known him for over three years, and before the yellow fever epidemic of 1878, and that he was during that time engaged in the fruit business.

FILIPPO CHIMENTO.

Sworn to and subscribed before me this the 23d day of August, 1881, at New Orleans' Louisiana.

[SEAL.] JOSEPH A. QUINTERO,
U. S. Commissioner.

UNITED STATES OF AMERICA,
Eastern District of Louisiana:

Personally appeared before me, the undersigned, U. S. Commissioner, Peter Lipari, of the city of New Orleans and State of Louisiana, who, being duly sworn, deposes and says that he is engaged in business in said city of New Orleans as a merchant; that he is well acquainted with Antonino Castanzo, who was recently arrested in the city of New Orleans, and who, on his arrival in the city of New York gave his name as Vincenzo Ribello; that he has known him since the year 1878, and knows that he was during that period engaged in the orange and fruit trade on the Mississippi River.

PETER LIPARI.

Sworn to and subscribed before me at New Orleans, Louisiana, this the 23rd day of August, 1881.

[SEAL.] JOSEPH A. QUINTERO,
U. S. Commissioner.

UNITED STATES OF AMERICA,
Eastern District of Louisiana:

Personally appeareed before me, the undersigned, U. S. Commissioner, H. Gragnon, of the city of New Orleans and State of Louisiana, who, being duly sworn, deposes and says that he is engaged in the fruit trade in the said city of New Orleans; that he has been well acquainted with Antonino Costanzo, who was recently arrested in the city of New Orleans, and who on his arrival in the city of New York gave his name as Vincenzo Ribello, and that he has known him since about a month before the yellow fever in 1878, and that he was during that period trading in oranges and other fruit.

H. GRAGNON.

Sworn to and subscribed before me at New Orleans, Louisiana, this the 23rd day of August, 1881.

[SEAL.] JOSEPH A. QUNITERO,
U. S. Commissioner.

UNITED STATES OF AMERICA,
Eastern District of Louisiana:

Personally appeared before me, the undersigned, U. S. Commissioner, E. J. Ewert, who, being duly sworn, says that he resides in the city of New Orleans and State of Louisiana; that he is engaged in business in said city as a coffee-house keeper; that he is well acquainted with Antonino Costanzo, who was recently arrested in the city of New Orleans, and who on his arrival in the city of New York gave his name as Vincenzo Ribello, and has known him since the spring of 1878, and has transacted business with him during that period.

ED. J. EWERT.

Sworn to and subscribed before me at New Orleans, Louisiana, this the 23rd day of August, 1881.

[SEAL.] JOSEPH A. QUINTERO,
U. S. Commissioner.

UNITED STATES OF AMERICA,
Eastern District of Louisiana:

Personally appeared before me, the undersigned, U. S. Commissioner, August Riedau, of the city of New Orleans and State of Louisiana, who, being duly sworn, deposes and says that he is engaged in the fruit business in said city and vicinity; that he is well acquainted with Antonino Costanzo, who was recently arrested in the city of New Orleans, and who, on his arrival in the city of New York, gave his name as Vincenzo Ribello; that he has known him since the time of the yellow fever in 1878, and that he was during that period trading in oranges on the river.

AUGUST A. RIEDAU.

Sworn to and subscribed before me at New Orleans, Louisiana, this the 23rd day of August, 1881.

[SEAL.] JOSEPH A. QUINTERO,
U. S. Commissioner.

UNITED STATES OF AMERICA,
Eastern District of Louisiana:

Personally appeared before me, the undersigned, U. S. Commissioner, Angelo Cusimano, of the city of New Orleans and State of Louisiana, who, being duly sworn, deposes and says that he is engaged in the business of a merchant in the city of New Orleans, where he resides, and is the owner of real estate and stock in trade; that he is well acquainted with Antonino Costanzo, who was recently arrested in said city of New Orleans under the name of Vincenzo Ribello; that he has been acquainted with him since the year 1878, and has always known him by the name of Antonino Costanzo instead of the name of Vincenzo Ribello, which name he gave on his arrival in New York after said arrest.

ANGELO CUSIMANO.

Sworn to and subscribed before me at New Orleans, Louisiana, this 23rd day of August, 1881.

[SEAL.] JOSEPH A. QUINTERO,
U. S. Commissioner.

UNITED STATES OF AMERICA,
Eastern District of Louisiana:

Personally appeared before me, the undersigned, U. S. Commissioner, P. Salamoni, of the city of New Orleans and State of Louisiana, who, being duly sworn, deposes and that he says is in business in the city of New Orleans as a merchant; that he is well acquainted with Antonino Costanzo, who was recently arrested in the city of New Orleans,

and who on his arrival in the city of New York gave his name as Vincenzo Ribello; that he has known him since the year 1878, and that he was during that period engaged in the fruit business at New Orleans and vicinity.

P. SALAMONI.

Sworn to and subscribed before me at New Orleans, Louisiana, this the 23rd day of August, 1881.

[SEAL.]

JOSEPH A. QUINTERO,
U. S. Commissioner.

UNITED STATES OF AMERICA,
Eastern District of Louisiana:

Personally appeared before me, the undersigned, U. S. Commissioner, G. Grande, of the city of New Orleans and State of Louisiana, who, being duly sworn, deposes and says that he is engaged in business in the city of New Orleans as a merchant, owning vessels engaged in commerce, and stock in trade; that he is acquainted with Antonino Costanzo, and knows him to be the same identical individual who was recently arrested in the city of New Orleans, and who, on his arrival in the city of New York, gave his name as Vincenzo Ribello; that he has known him since the year 1878, and has sold him goods during that period.

his
G. × GRANDE.
mark.

Witness to mark:
GEO. P. DAVIS.
TONY IGNACIO.

Sworn to and subscribed before me at New Orleans, Louisiana, on this the 23rd day of August, 1881.

[SEAL.]

JOSEPH A. QUINTERO,
U. S. Commissioner.

UNITED STATES OF AMERICA,
Eastern District of Louisiana:

Personally appeared before me, the undersigned, U. S. Commissioner, Salvatore Gioja, of the city of New Orleans and State of Louisiana, who, being duly sworn, deposes and says that he is a master of a lugger engaged in the trade of the Lower Mississippi River; that he is well acquainted with Antonino Costanzo, who was recently arrested in the city of New Orleans, and who, upon his arrival in the city of New York, gave the name of Vincenzo Ribello, and that he has known him since the year 1878, and before the yellow fever epidemic of that year, and that he was a fruit dealer during that period.

his
SALVATORE × GIOJA.
mark.

Witnesses:
GEO. P. DAVIS.
ANTONI PILLIGRINE.

Sworn to and subscribed before me at New Orleans, Louisiana, this the 24th day of August, 1881.

[SEAL.]

JOSEPH A. QUINTERO,
U. S. Commissioner.

UNTED STATES OF AMERICA,
Eastern District of Louisiana:

Personally appeared before me, the undersigned, U. S. Commissioner, Mateo Artala, of the city of New Orleans and State of Louisiana, who, being duly sworn, deposes and says that he is a shoemaker by trade, and doing business in the city of New Orleans; that he is well acquainted with Antonino Costanzo, who was recently arrested in the city of New Orleans, and who upon his arrival in the city of New York gave his name as Vincenzo Ribello; that he has known him since before the yellow fever in 1878, and that during that period he was engaged in the fruit business.

his
MATEO × ARTALA.
mark.

Witnesses:
GEO. P. DAVIS.
ANTONE PILLIGRINE.

Sworn to and subscribed before me at New Orleans, Louisiana, this the 24th day of August, 1881.

[SEAL.]

JOSEPH A. QUINTERA,
U. S. Commissioner.

UNITIED STATES OF AMERICA,
Eastern District of Louisiana:

Personally appeared before me, the undersigned, U. S. Commissioner, Carmelo Guarino, of the city of New Orleans and State of Louisiana, who, being duly sworn, deposes and says that he is engaged in business in the fruit trade in the city of New Orleans; that he is well acquainted with Antonino Costanzo, who was recently arrested in the city of New Orleans, and taken to New York City, where upon his arrival he gave his name as Vincenzo Ribello; that he has known him since before the yellow fever epidemic of 1878, and that he was during that period engaged in the fruit trade.

CARMELO GUARINO.

Sworn to and subscribed before me at New Orleans, Louisiana, this the 24th day of August, 1881.

[SEAL.] JOSEPH A. OUINTERO,
U. S. Commissioner.

I, George P. Marsh, envoy extraordinary and minister plenipotentiary of the United States of America in the Kingdom of Italy, do hereby certify that the annexed documents, respectively marked "inserto A," and numbered 1 to 89, are one and each of them properly and legally authenticated so as to entitle them to be received in all extradition proceedings brought under and by virtue of the treaty with the United States relating to the extradition of alleged fugitives from justice, and also in all proceedings to establish the charge of criminality and for similar purposes before the Italian tribunals.

Witness my hand and the seal of the legation of the United States of America, at Rome, in said Italy, the eleventh day of March, in the year of our Lord one thousand eight hundred and eighty-one.

[SEAL.] GEORGE P. MARSH.

EXHIBIT A.

This is to certify the authenticity of the signature of the chancellor, Francesco Foschini (folio I), that of the vice-chancellor, Dominik Borghese (folio 3, 4, 5, 6, 8, 23, 35, 36, 37, 38, 54, 57, 74, 76), and of the prothonotary Michael Rossi (fos. 10, 12, 25, 28, 40, 60, 62, 64, 79), and of the clerk, Joseph Majno (fo. 81).

Given in Rome, the 4th of March, 1881, for the minister, Bouchetti.

[Seal of the ministry of justice.]

MINISTRY OF FOREIGN AFFAIRS.

Examined for the legalization of the signature of Mr. Rouchetti, gen'l secretary of the ministry of justice.

[Seal of the ministry of foreign affairs.]

Rome, 11 March, 1881.

The chargé.

(Signature illegible.)

Order of arrest.

Court of appeals of Palermo. Chamber of indictments.

In execution of the decree of the 16th of April, 1878, the chamber of indictments orders the officers of the public force to arrest and commit to the jail of the tribunal of Palermo Esposito Giuseppe, alias Randazzo, foundling, aged 30, from Alia. Charged with—

1. Having instituted an association of malefactors for criminal purposes against the safety of persons and property in the district of Termini, between 1874 and 1877, within the meaning of the articles 426, 427, 479 of the Penal Code;

2. Having attempted the violent extortion of lira 255,000, by detention and injuries perpetrated on the person of Mr. Vincentzo Fuschi, on the 22d of August, 1876, in the efeudal estate of Giardino, territory of Caccamo (within the meaning of articles 96, 98, 601, 602, 603 Penal Code);

3. Having violently extorted lira 40,000 by the detention of the person and attempted homicide to the injury of Mr. John Forrester Rose, with aggravated circumstances, within the provisions of the article 430 Penal Code, on the 4th of November, 1876, in Lercara Friddi; within the meaning of the Art. 601, 602, 603, 596, No. 2, 96, 97, 522, 430, Penal Code;

4. The premeditated assassination, accomplished by lying in ambush of Giuseppe Guccione, on the 20th of March, 1877, on the Portella road, territory of Alia, within the meaning of the Art. 522, 526, 528, 529, 531, Penal Code;

5. Having violently extorted 8,000 lira to the injury of Antonino Formusa, by de-

tention of his person and with the aggravated circumstances contemplated for by Art. 430, Penal Code, on the 15th of May, 1877, and following days in the Territory of Termini Imerese, within the provisions of Art. 601, 602, 430, Penal Code.

Every representative of the public force is hereby summoned to give assistance for the execution of this warrant, if needed.

Finally, the keeper of the jail of the aboved-named city is ordered to receive him in conformity with existing laws.

Done at Palermo, at the court-house, April 16th, 1878.

LENTINI,
BENTIVEGNA,
FERRO LUZZI.

FERDINANDO ARCIDIACOM,
Vice Chancellor.

A true copy of the original delivered to the right hon. attorney-general of the king, this day, in Palermo, January 30th, 1881.

The chancellor:

[SEAL OF THE COURT OF APPEALS OF PALERMO.] FRANCESCO FOSCHINI.

Oral declaration and examination of sworn witnesses in the trial of Giuseppe Esposito, alias Randazzo.

(Charged with the organizing of an association of malefactors intended for criminal purposes against the safety of persons and property in the territory of Termini Imerese during the lapse of time between 1874 and 1877.)

Under prefecture of Termini Imerese, Cabinet No. 182. Matter: Association of malefactors.

TERMINI IMERESE, *the 23d June*, 1874.

To the Very Hon. Attorney of the King, Termini:

It is now an incontrovertible fact and the firm conviction of the public that the uninterrupted succession of crimes perpetrated in the present time, among which the most clamorous and recent are those against Messrs. the Barons Porcari and Igadari; that the audacious kidnappings, the numberless assassinations, and the diffusion of minatory letters by unknown individuals, cannot but be and must be the work of a large association of malefactors, as stated also by your honour in your secret communication of the 6th inst. No. 5331.

As the chiefs of this association may be named, the notorious bandits Giachimo (Joachim), Di Pasquale, Antonino Leone, of this district; Capraro, in that of Bimona; Rocca and Rinaldi, in that of Cefalu.

Extract agreeing with the original.
Termini, October 5th, 1877.
For the vice-chancellor:

VIVIANI.

A true copy.
Palermo, February 21st, 1881.
The chancellor:
Pro vice-chancellor:
[SEAL OF THE TRIBUNAL OF PALERMO.] DOMINICO BORGHESE.

In the year 1877, the first day of June, at Montemaggiore.

We, Chev. Lucchesi, Michele, police deputy, declare herewith to all whom it may concern:

That, having been informed by a secret detective that the chief of bandits, Leone, and two other malefactors, were in hiding in the road Costa di Adamo, we went immediately to that place, followed by commander of the R. R. carabineers of the station, Mr. Callari Camillo, with two of his dependants; by a detachment of 12 mounted police guards, led by the Brigadier Sielsi Gactamo; by a detachment of 17 bersalieri, under the command of the Lieutenant Alfredo Giannini; and finally, by a detachment of six police guards, afoot, and two carabineers afoot, led by the Brigadier Olisi Antonio.

Orders having been given to surround the locality the search commenced without delay at 2 o'clock p. m.

The malefactors, three in number, were in ambush amidst the corn; as the searchers approached them, they fired their guns upon the agents; these answered them with

their arms, and after one hour of shooting the bandits were killed. It was then ascertained that one of them was the chief of the band, Leone Antonino, from Ventimiglia, in Sicily. The two others were not recognized.

The present verbal process has been drawn up about this occurrence and signed by us, as well as by every one of the above commanders:

OLISI ANTONIO,
Brigadier.
ALFREDO GIANNINI,
Lieutenant of the Bersagheri.
CALLERI CAMMILLO,
Brig. of the R. R. Carabineers.
LUCHESI MICHELE,
Police Deputy.

This extract conforms with the original, and is issued at the request of the judge.
The chancellor:

Pro. VIVIANI.

Transcript taken in conformity with the original.
Palermo, February 21st, 1881.
Pro. The chancelor:
[SEAL OF THE TRIBUNAL OF PALERMO.] Pro. DOMINICO BORGHESE,
Vice-Chancellor.

Kingdom of Italy, police office. No. 502. Matter: Confession of the brigand Passafiume.

ALIA, *July 6th*, 1877.

In continuation of my last communication, in which I reported the surrender of the brigand Passafiume, inclosing the verbal process relating to the occurrence, I have the honour to add:

The malefactor declared that he had belonged to the band "Randazzo Leone" but a few days, and that at the time when the brigand Salpietra and fellows of his had been seized, he took shelter, together with Randazzo, in the city of Termini itself, at the home of one Salvatore Di Novi, who, he said, lived in the vicinity of the gate of Caccamo. The next night Randazzo and Passafiume, fearing to be likewise caught, left Di Novi's house, and guided by him, hid themselves in ground belonging to Di Novi. It was there that he left Randazzo and went to the suburbs of Alia in order to surrender himself.

This declaration has been made by Passafiume in the presence of Mr. Gaetano Salemi, druggist of Montemaggiore, and of Napoli Giovanni, corporal of the mounted police; and he added that if confronted with Di Novi he would assert everything to his face. Therefore, entertaining no doubt of the truth of the statement, I requested the under prefect of the district to arrest the said Di Novi, carefully describing his domicile.

The police inspector:
[SEAL OF THE TRIBUNAL OF PALERMO.] M. LUCEHES.

Transcript conforms with the original.
Palermo, 21st of April, 1881.
The chancellor:

Pro DOMINICO BORGHESE, *Vice Ch.*

Municipality of Alia. In the year 1877, the ninth day of the month of July, in Alia

Before us, Giuseppi Guccione, son of the late Joachim, mayor of this commonalty, and Farina Fresa Giuseppe, under-lieutenant of the R. R. carabineers, and commander of their detachment in this place, the brigand Esposito Giuseppe, alias Randazzo, native of this community, presented himself, saying that he voluntarily surrendered himself to us, to the above said under-lieutenant, and also to the mayor of Roccapalumba, in order to exculpate himself from the charges brought against him.

Of which declaration we drew this verbal process, stating the voluntary surrender of the brigand, and forward the same to the tribunal at the same time with the bandit himself.

GIUSEPPE GUCCIONE.
FARINE FRESA GIUSEPPE,
Under-Lieutenant.

[SEAL OF THE TRIBUNAL OF PALERMO.]
LUIGI POGGETTI,
Secretary of the Municipality.

Transcript conforms to the original.
Palermo, February 21st, 1881.
The chancellor:

Pro DOMINICO BORGHESE,
Vice Ch.

Municipality of Alia. No. 668. Matter: Surrender of the brigand Randazzo.

ALIA, *the* 10*th of July*, 1877.

Some days ago, having an understanding with the under-lieutenant of the R. R. carabineers, Mr. Farina Fresa, and with Mr. Guiccione Gioachino, alderman, we endeavored, through the mediation of a trustworthy person to induce the bandit Esposito Giuseppe, alias Randazzo, of Alia, voluntarily to surrender himself.

Randazzo, who knew that he was continually searched for by the public force, and especially by the detachments and flying columns of this department, and being moreover driven to extremities owing to the moral and material co-operation of all honest citizens, and owing also to the activity of the deputy Mr. Dompe Giovanni Battista, resolved to have a meeting on the evening of the 8th inst., with a person in our confidence, and declared himself ready to surrender, provided we promised not to persecute him.

At four o'clock in the evening of the next day, the 9th, whilst a certain Leone Salvatore, peasant (also a confident of ours), and a certain Savario Giuseppe, a peasant from Caccamo were speaking together in the proximity of the fountain called Zarbo, in the territory of Caccamo, they were approached by Randazzo, who begged them, especially addressing Leone, being his countryman and acquaintance, to accompany him secretly to Alia, as he wished to present himself to me and to the under Lieutenant Farina, according to the promise. Leone and Saverio did it willingly, and led him about 8 o'clock of the same evening to my home, where under Lieutenant Farina also was present, and there, with the assistance of our secretary, a verbal process have been drawn up, of which I enclose a copy.

The mayor:

[SEAL OF THE TRIBUNAL OF PALERMO.] G. GUCCIONE.

Transcript conforms with the original.
Palermo, February 21st, 1881.
The chancellor:

Pro DOMENICO BORGHESE,
Vice-Chancellor.

Examination of a sworn witness, in the year 1881, the 18th of February, in Palermo, at the residence of the civil and correctional tribunal:

Before us, advocate Chev. Tommaso Costanzo, judge charged with the preparation for the trial and assisted by the undersigned, substitute to the chancellor, and after having taken the oath, in accordance with the law, appeared, in pursuance of a previous summons, the undersigned witness: who, after having been reminded of the moral importance of the oath, of the sacred obligation contracted before God by the same, and of the penalties incurred by perjury or reticence, under the provision of the articles 365, 366, 367, and 369 of the Penal Code, swore standing up, that he would say the whole truth, and nothing else but the truth.

Being asked the usual questions, all those prescribed by the article 172, he answered:

I am Salemi Gaetano, son of the late Giovanni, aged 43, druggist, native and resident of Montemaggiore, not interested in the accused.

On the 2nd of July, 1877, I went from Montemaggiore to Alia, together with the inspector of the police, Mr. Lucchesi, our errand being to bring about the surrender of Luciano Passafiume, who lay concealed.

Passafiume refused to say anything about his association with the brigand, Randazzo, and stated only that he hid himself because he was searched for by the police for some reason unknown to him.

The following day when the inspector had returned to Montemaggiore, together with Passafiume, I heard from Lucchesi, that he had been told by the prisoner that, on the same day in which Salvatore Salpietra and his companions were arrested in Termini, he and Randazzo took flight a short time previous, from Salpietra, as Randazzo intended to go aboard a ship; that a little while afterwards they returned to the house of Salvatore Di Novi, from which they went to another house of the same Di Novi, in the country where they separated, Randazzo remaining there and Passafiume going elsewhere. Although, as I said, I did not hear Passafiume's confession, I, nevertheless, considered it, and consider it now, to be true, because Lucchesi, on relating it invited me to go with my detachment (composed of honest citizens who had voluntarily come forward to assist in the re-establishment of the public safety) to the house of Di Novi, where we should find Passafiume, who, as Lucchesi asserted, was ready to join us, but we abstained, as such a step was late and useless, Lucchesi having previously wired to the under prefect of Termini.

After having read and confirmed, the present verbal process have been signed by witness and officers.

GAETANO SALEMI,
TOMMASSO COSTANZO,
MICHELE ROSSI.

[L. S.]

Examination of a sworn witness, in the year 1881, the 21st of February, at the residence of the civil and correctional tribunal of Palermo.

Before us, advocate Chev. Thommaso Costanzo, judge, assisted by the undersigned, substitute of the chancellor, appeared in pursuance of a previous summons, the undersigned witness:

Reminded of the importance of the oath and the religious obligation thereby assumed by believers before God, and of the penalties incurred by purjury and reticence under the provisions of the Art. 365, 366, 367 and 369 of the Penal Code, the witness swore, standing up, that he would say the truth and the whole truth, and nothing else but the truth.

Thereupon having been asked the usual questions, including those prescribed by article 172, he answered:

I am Napoli Giuseppe, son of the late Gaspare, aged 40, born in Partanna, territory of Yraponi, resident of Corleone, brigadier of the mounted police.

When Luciano Passafiume (who had been in hiding) surrendered himself and I was directed to take him from Alia to Montemaggiore, I asked him about his association with the other brigands and about his relations during the time of his concealment, but he refused to make any statement.

On that occasion I heard from the suspector, Lucchese, and from many others, whom I cannot name, that Passafiume himself had confessed to him, that he had been associated, though but during a few days, with the Leone band, and had taken refuge in Termini, at the house of a certain Salvatore Di Novi; that happened on the 23rd of June, 1877, in the time when a conflict took place between the police and the brigand Salpietra, and his companions, who where then arrested. Although those circumstances were not confided to me by Passafiume, I considered them to be true, the more as Mr. Lucchesi, added that Passafiume was ready to lead us to the house of Salvatore Di Novi, where afterwards he found shelter with the other brigand, Giuseppe Randazzo.

Before the assassination of the unfortunate Giuseppe Guccione, of Alia—namely, in the month of March last—and during the concealment of the bandit Giuseppe Randazzo, owing to my friendly relations with Guccione I often accosted him, in order to get from him some information and light which could facilitate the seizure of Randazzo; and Guccione said to me that it was not improbable that Randazzo was sheltered in the very city of Termini, and indicated the house of Balsano Antonini, who was in intimate relations with Randazzo, and in order to convince me of the fact Guccione informed me that the named Randazzo had been one of the assassins of the chancellor and vice-chancellor of Alia, and that having been wounded in the leg by a shot in that affair, Randazzo came into Termini to cure his wound in the house of Balsano, from whence he went into Terabia; but Guccione did not give the names of the persons who had informed him of these circumstances.

Read and confirmed, the present process verbal has been signed.

NAPOLI GIUSEPPE,
Brigadier of the Guards on Horseback.
TOMMASO COSTANZO.
[L. S.] MICHELE ROSSI.

CACCAMO, *the 24th of August*, 1876.

We, Martello Ernesto, chief deputy of the police; Cavallari Francesco, brigadier of the R. carabineers, commander of the station of Caccamo—all three officers of the judicial police; Giullo Pietro, commander of the detachment of cavalry; Saloa Gaetano, under brigadier of the same body, make known to the authorities:

That about 8 o'clck p. m. of the 21 inst. a gang of 12 unknown malefactors, some of them afoot, some on horseback, entered a country seat on the road called S. Nicola, distant two miles from Caccamo, and having obtained admission by pretending to be agents of the police, they ordered Giumeli Andrea, aged 30, and Ralaga Tentista, aged 20, both peasants in the service of Mr. Fusci, Vincenze, aged 71, proprietor of estates, of Caccamo, to lie down with the face toward the ground, and asked where their master was. The peasants answered that he was in bed in that very room. The brigands knew very well that Fusci was an old, helpless man, deaf, nearly blind, and enormously fat; and so they ordered Spadafora and Falaga to remain in the aforesaid posture whilst they summoned Ginosnele to dress his master and compelled him to follow them.

After that they assaulted Spadafora, and by violence and beatings robbed him of a bill for 5 lira, and some clothes to the amount of 13 liras. Then they obliged Grosnele to give them some bread and a bottle of wine, and compelled Fusci to follow them into the open country mounted on one of his own mules. Although the malefactors had covered their faces with handkerchiefs, in order to avoid being recognized, they nevertheless took the further precaution of ordering the people to stay in the house, and then

departed with Fusci, in an unknown direction. About an hour elapsed during all those operations, and terror prevented the people from making an immediate report of the occurrence, and therefore this office received intelligence of it only about 11 o'clock.

The police deputy, Cavatore, the brigadier, Cavallaro, the under-brigadier Scelsa, with their suite, hastened to the place, verified the above-stated circumstances, made searches in the environs, visited many suspected people, but they could not discover any trace either of the hiding place or of the authors of the deed; later having got some evidence, they visited the ex-feudal estate Pianci, and found there some traces of the recent passage of a mare which had only two shoes on the forefeet, and such traces were directed toward a big, massive stone, behind which a pack-saddle, still wet from sweat, as if somebody had just alighted, besides two sheepskins, the one white, the other black. Not far off they noticed a shepherd who fled at the sight of the police; and as through the seizure of that individual some other evidence might be obtained, the police agents thought it well to make for the moment a sham retreat in order to get a better chance for his subsequent seizure. They returned then to S. Nicola, where they were joined by Deputy Martelli, by the commander of the military, and by other public agents.

After consultation, they moved late in the night to the ex-feudal estate Piana, and looking about there they succeeded, about 6 o'clock in the morning of the 23d, in arresting the aforesaid shepherd, who declared himself to be Catalano Salvatore, son of the late Giuseppe, aged 30, from Caccamo. He said that his flock belonged to a certain Rosario Lo Bue, son of the late Joseph, aged 25; that he was accustomed to frequent that locality; that the pack-saddle and the two aforesaid sheepskins belonged to him, and finally when questioned about the abduction of Fusci, he said he was convinced that the crime had been committed by his master, together with a certain Rizzo Giacinto from Montemaggiore, Gallo Mariano, Joseph's son, shepherd of Caccamo, and with the brothers Giovanni and Matteo Tilipello; he added that his master had started thence armed and on horseback, in the evening of the 21st before it grew dark, and had come back in a great hurry in the morning of the 23d, leaving there the saddle and the skin before mentioned.

From these allegations we conjectured that Catalano himself had participated in the abduction and we arrested him. We tried likewise to arrest the said Lo Bue, but in vain, inasmuch as he, affording therein indubitable proof of his guilt, had concealed himself on the approach of the police.

We must premise that previous to the seizure of Catalano, we encountered Gullo, and asked him about the abduction, but as there was no reason then to suspect him we let him go. We tried to find him after Catalano's revelations, but, having seen us speaking with Catalano, he disappeared, giving thus evidence of his guilt, and having from afar perceived certain guards, who were going in search of him, as he was keeping sheep almost on the summit of mount St. Calogero, he eluded the pursuit of the police. Afterwards were arrested the brothers Matteo and Giovanni Fillipello, peasants, from Caccamo; one of them stated that the authors of the abduction were Patti Natale, aged 25, peasant, the brothers Vito and Nicasio Polizzi, citizens, besides the brothers Natale and Giuseppe Motti, all from Caccamo, and he added too, as against Motta Giuseppe that the latter had it in his charge to write to the relatives of Fusci a letter asking the money of his redemption.

The aforesaid Polizzi and Motta were arrested in Caccamo in the morning of the 24th instant. The said Patti being seized at a different time and place, said that some days previous, being in the vicinity of the railroad station, he spoke with the aforesaid Rizzo Giacinto, from Montemaggiore, who invited him to participate in an abduction, without specifying individuals, and he refused, and that having asked Rizzo how he would manage their business, Rizzo answered that he would work together with the brothers Filipello, with a certain Greco Antonino, custom-house guard, native of Frebia, resident of Caccamo, and with the aforesaid Gullo and Catalano Salvatore. We tried, but without success, to arrest Greco, who had concealed himself, but we succeeded in seizing Rizzo. It is worthy of notice that Rizzo, the brothers Filipello, and Gullo, were repeatedly accused by different persons from different localities, and at different times, no one knowing about the others, a circumstance which approves the guilt of the accused. At about 1 o'clock p. m. on the 23d inst., we had occasion to speak with Messrs. Liborio and Georgio Fusci, the sons of the kidnapped man, and their declaration confirmed the evidence tending to prove the prisoners guilty.

At three o'clock in the afternoon of the 23 inst., other searches were set on foot to discover the kidnapped man, the impression being that he was concealed in the mountain of Calogero; because, inasmuch as, at the very first movements of the police, the report of a gun had been heard, which we considered, and, in fact, turned out to have been, a signal, given by an outpost of the malefactors to their companions, who, up on the hills, were guarding the hiding-place where their victim was afterwards found.

The prisoners were further examined, and some of them mutually accused each other

One of them, Giovanni Filippello, unable to explain the contradictions into which he he had fallen, or accusations made against him in different places, and by different persons, resolved to reveal the place where Mr. Fusci had been concealed, and offered himself to be the guide. The entire force then advanced with him toward the highest summit of Mount S. Calogero, through steep and wild ways. They arrived to the so-called Valley of Hell, and after a very fatiguing march through it on the side of Siara and precisely in the exit, Giardinazzo Filipello pointed out the location of a cave wherein Mr. Fusci had been concealed. The place indicated is inaccessible from above, the entrance from underneath extremely difficult. There are no trees about there, no cultivated soil, and it requires a great deal of effort to make the ascent.

No trace was to be found there of charcoal-makers, neither any other sign betraying the vicinity or presence of human beings. Nevertheless it was there they had dragged the seventy year old Fusci, where he would have perished if not soon delivered. The cave had an entrance of considerable width, which had been walled up. Having removed the stones which obstructed the entrance, we had to descend until we found Fusci lying on the bare earth, and by his side the bread and the bottle, which the malefactors took from his house. From that cave, hardly good enough to give a temporary shelter to a fugitive, Fusci was taken out, delighted to be amidst his sons, who had followed the public forces to the spot, and he was taken again to Caccamo.

Before closing this verbal process it will be useful to repeat that if Fusci had not been taken in time out of the hands of the malefactors he undoubtedly would have perished on account of his old age, of the moral shock endured, of the condition of the atmosphere in which he lived, for being almost hermetically shut in, the place was without air, and very difficult to be discovered, and not such as to give traces of the crime.

The situation of the cave, and even the difficulties overcome by the malefactors in dragging up there a helpless old, sick man, such as Fusci, give rise to the suspicion that the authors of the crime were determined to let him die in detention if the family had not paid the price asked for.

The prisoners and those still in hiding became the object of the public indignation. Some of them have a very bad record, and all are of ill-fame, and thought of as capable of perpetrating any criminal deed.

Together with the prisoner, the seized things belonging to Lo Bue and the bread and the bottle found in the cave are put at the disposal of the justice.

The mule belonging to Fusci and which had been used for conveying him was found wandering at large.

Signed by Martello Ernesto, police deputy chief; Cavatore Franc'o. police deputy; Cavallari Ermicioce, brigadier; Gallo Pietro, commander; Salso Gaetano, under-brigadier; Negri Luigi; Panaro Giuseppe; Colombo, Franceno; Ghedim; Riccardo; Filippini, Mourizio; Bandini Pietro; Di Gioachino Luigi; Galli Giovanni; Napoli, Giuseppe; Vito, Barone; Anzelmo, Giuseppe; mark of + Fusci Giuseppe.

A correct copy.
Palermo, 21 February, 1881.
For the chancellor:
[SEAL OF THE TRIBUNAL OF PALERMO.] DOMINICO BORGESE,
V. Chancellor.

Examination of a sworn witness.

In the year 1881, the 16th of February, in the examination office at Palermo.

Before us, advocate Cherv. Tommaso Costanzo, judge of the tribunal of Palermo, assisted by the undersigned, vice-chancellor, appeared, according to previous summons, the undersigned witness:

After having been reminded of the importance of the oath, the religious sanction of it, which believers impose upon themselves before God, and the penalties threatened in case of perjury or reticence, under the provisions of the articles 365, 366, 367, 369 of the Penal Code, the witness standing up, sworn to say the whole truth, and nothing else but the truth.

Afterwards, to the interrogatories addressed to him, he answered:

I am Spadafara Vincenzo, alias "Papa," son of Joseph, aged 32, native and resident of Caccamo, disinterested as respects the parties.

The 21st of August, 1876, in the first quarter of the night, after evening service, I returned to the home of Mr. Vincent Fusci, where immediately on my arrival he invited me to eat a plate of paste. After that, he went to his room to sleep, and I hastened to feed the animals of the mansion. All at once four people appeared, two on horseback, two afoot, who entering, cried out, "By God! is that so, that you protect the thieves? Do you not recognize the commander of the public forces?" So speaking they ordered us to lie down on the ground with the face toward it; that is to say,

myself and Fusci's attendant, Feolista Falico. They covered us with bags, and two of them watched us, whilst the two others ordered the other attendant, Lireci Andreas, to open the door where the boss slept. It was one o'clock a. m. (Italian time), and the boss was sleeping. They awoke him with a blow of a stick, ordered Sireci to dress him and to prepare a mule, on which they put Fusci, and went away with him.

As they stated, one of the malefactors said to Sireci, that the family of Fusci had to pay 20,000 liras and refrain from informing the police, otherwise Fusci would lose his life, and added that with a couple of days a letter would be delivered indicating the place where the money must be taken.

After a half an hour, we three, who were left by the malefactors locked up in Fusci's sleeping room, hearing no more noise, opened the door and tried to ascertain the direction taken by them, but we could not see them, because they had disappeared.

I did not recognize any of the malefactors, either of those who remained in the court (yard), or of those who came in. As I went from the sleeping room, I became aware that there had been stolen a pair of shoes, a pair of pants, a waistcoat, containing five lira of currency, which things belonged to me; besides some bread and a bottle of wine, which belonged to Fusci.

The very night of the abduction I, together with the two other attendants, gave information to the police, after which, the Royal carabineers, the cavalry, and the deputy went in pursuit along the Piani road; we did not meet Catalano Salvatore, the shepherd of Lo Bue's flock; we found there only the saddle, wet from sweat and instead of Catalano, we met another young man, whose name I don't know, who watched Lo Bue's flock,

Catalano, when arrested, declared to the agent of the public force, that the kidnappers were Filipello Giovanni and other individuals, whom I don't know.

Filipello, when arrested, led us to the cave where Fusci was detained, whom we delivered and took back to his home the evening of Wednesday, 23d August, 1876.

The aforesaid cave is in the locality called Giardinazzo, in Sciara's estate.

Besides the aforesaid goods, the said individuals stole also a gun belonging to Vincenzo Fusci.

After reading and confirming this statement signatures were made only by officers witness not knowing how to write.

TOMMASO COSTANZO.
MICHELE ROSSI.

Examination of sworn witness.

The year 1881, the 16 of February, in the office of the tribunal of Palermo.

Before us, Chev. Tommaso Costanzo, judge of the civil and criminal tribunal of Palermo, assisted by the undersigned vice-chancellor; appeared according to previous summing, the undersigned witness.

After reminding him of the moral importance of an oath, and the religious obligation imposed by it before God, and the provisions of the articles 365, 366, 367, Penal Code, he swore, standing up, that he would say the whole truth, and nothing else but the truth.

Interrogated also under the provision of the article 172, he answered:

I am Sireci Andreas, son of the late Domenic, aged 23, a native and resident of Caccamo, attendant of Fusci, disinterested in respect of the parties.

On the evening of 21 August, 1876, I was in the house of Mr. Fusci, Vincenzo, in the locality called St. Nicolo, where, after I had eaten a little of paste, which Fusci had offered me, I went to prepare the food for the animals, whilst the boss had retired to his sleeping room, the door of which was locked up by the attendant Teodista Falica, who took off and kept the key of it. At that moment I saw six people on horseback entering the court, whilst some others, about 6 or 7, stood outside; those who came in were almost muffled and armed, and they cried out, speaking in a disguised voice: "Ruffians, do you protect the thieves in this way; let us now see where you have concealed them! Do you not recognize the public force and the commander?" At the same time they ordered my companions T. Salica and V. Spadafora to lie down on the ground, with the face down. I myself was ordered to let them into the room where the boss was sleeping; there they awoke him with cursings, and summoned him with a box on the ear to arise immediately, whilst I myself had to dress him. When I saw the malefactors gave the master a box, I requested them not to maltreat him, but they answered only by striking me in my turn. After dressing, I was compelled to prepare a mule, and on it they put the boss, and took him with themselves. Two of the ruffians remained to watch the two other attendants of the house, and altogether with me they were locked in the room where the boss had slept.

I did not recognize any one of the malefactors, only I observed one of the mules wore a harness.

After we three had heard a whistle we took courage and opened the door and got out to observe what direction the malefactors had taken, but they were not longer visible. We started immediately for Caccamo to give intelligence to the family, which made the statement before the police, and the latter with myself and Spadafora went to the rescue of the victim.

We encountered a boy, whose name I do not know, who told us he had seen three people on horseback, who with great speed from Piana towards Rotonda.

After some inquiries, the police arrested Catalano Salvatore, Patti Natale, and Fillippello Giovanni.

I watched with some carabineers over Catalano and Patti, and the other part of the public force, led by Fillippello, went to the cave where the captive was concealed. I could not tell more than that, as I myself did not witness the following occurrences, because, as I said, I was left with the arrested people in Piani.

I did not hear from the prisoners the names either of the authors or of the accomplices, but the cavalry soldiers told me that the arrested ones threw the responsibility of the deed upon Rosario Lo Bue, the brothers Motta, the brothers Palizzi, and Jacinto Rizzo, besides Gullo Mariano and Greco Antonino.

As the malefactors took my master off with them they ordered the two attendants to report to the family that the amount of 20,000 lira was to be taken to a place to be indicated by letter, otherwise they would kill the master. From Fusci's home in St. Nicolas to Caccamo there is a distance of about two miles through the ordinary way, but there are paths to shorten the distance to about 1½ miles.

After the reading of this examination it was confirmed and signed by officers only, witness being illiterate.

TOMMASO COSTANZO.
MICHELE ROSSI.

Oral declarations and examinations of sworn witnesses in the case against Esposito, alias Randazzo, accused of violent extortion by abduction of the person, to John Forester Rose, in Lercara, November 4, 1876.

LERCERA, *November 4th*, 1876.

Office of public security. No. 104. Matter: Detention of the rich proprietor Forester Rose, Giovanni, son of the late Giovanni, aged 23, native and resident at Palermo, English citizen.

This morning, about 10 1–2 o'clock, four unknown brigands, at the Casa di Dometano distant one kilometer from Lercara, along the way toward the railroad station, captured Mr. John Forester Rose, and also Nicolas Nicolisi, son of Joseph, aged 26, from Palermo, proprietor, and a certain Giovanni Losauro, son of Antonino, aged 23, native of Alia and resident here, attendant, who all were coming on horseback from the railroad station, and the unknown individuals took them to Fiumetorto and Mercalo Bianco, where Nicolosi and Losauro were freed.

The four brigands were on horseback and armed, and up to this time have made no proposition as to ransom.

I hasten to give intelligence to your honor as to so enormous a crime, and I shall give further accounts and informations looking to the rescue of the captive and the arrest of the brigands.

The deputy:

[SEAL.] RIZZI.

Transcript, Palermo, 21 February, 1881.

For the chancellor, the vice-chancellor:

DOMINICO BORGHESE.

To the ATTORNEY OF THE KING, *in Termini.*

LERCARA, 14*th Nov.*, 1876.

Office of public security, police. No. 104. Matter: Detention of the rich proprietor, Forester Rose, Giovanni, aged 23; from Palermo, English citizens.

This morning about 10½ o'clock, 4 unknown individuals captured in Casa Donnetano, one kilometer from Lercara, on the way to the railroad station, Mr. John Forester Rocilas Nicolosi, aged 26, from Palermo, his employé, and his attendant, Lasano Giovanni, aged 23, from Alia, here residing, all of whom were on the way from the railway station. They conducted them forward to Fiumetorto and Casabianca, where Nicolosi and Losauro were delivered.

The four brigands were on horseback, armed with double-barreled carbines, and up to this time they have not entered into negotiations for the delivery of Mr. Forester.

RIZZI.

Transcript, Palermo, 21 February, 1881.
For the chancellor, the vice-chancellor:

[SEAL.] DOMINICO BORGHESE.
To the ATTORNEY OF THE KING, *in Termini.*

Verbal process of identification.

In the year 1877, 2d October, in the jails of Termini:

For the purpose of identifying Giuseppe Esposito, alias Randazzo, indicted of violent extortion by kidnapping indicated by Nicolas Nicolosi in his examination of the (date omitted.) W. John Baptist Amormino, judge of the tribunal of Termini, assisted by the undersigned, clerk, after taking the oath according to law, went to the prison with the witness and gave direction according to the prescription of the article 233 and following of the Penal Code.

Afterwards we caused to be brought before us the indicted prisoner, together with three other persons chosen amongst those most resembling him. The indicted chose to be the second in the line from the right hand of the observer. Afterwards the witness, Nicolas Nicolosi (who stood in a separate room wherefrom he could neither see nor speak to any one), was introduced, and the oath taken according to article 283 of Penal Code; he swore that he would say the truth and nothing else but the truth, and recalling to his mind the importance of an oath, the obligations incurred thereby, the obligation and penalties impending over perjurers and the reticent, we invited him to observe attentively whether among the individuals before him he recognized the one of whom he spoke in his examination. Witness, after close attention, replied:

"The individual which occupies the second place at the right of the line seems to me to be one of those who effectuated the seizure of Mr. Rose, and precisely the man who, on Mr. Rose taking flight, fired a gun at him. I add, that said individual did his best to avoid to be looked at in the face, but, notwithstanding, from his features I infer that he is the malefactor who was called Randazzo."

The officers then state that witness indicated the person of Randazzo.

Read and confirmed.

NICOLO NICOLOSI.
G. BATT. AMORTMINO.
LUIGI CIMINO.

[SEAL.]

True copy.
Palermo, 21 Feb., 1881.
The Chancellor:

Per DOMENICO BORGHESE,
V. Chancellor.

Verbal process of identification.

In the year 1877, the 6th of October, at the jails of Palermo.

For the purpose of identifying Giuseppe Esposito, alias Randazzo, indicted of violent extortion by kidnapping, indicated by Nicolas Nicolosi in his examination of the (date omitted), we, John Baptist Amormimo, judge of the Tribunal of the Termini, assisted by the undersigned, clerk, after taking the oath according to law, went to the prison with the witness and gave direction according to the prescription of the article 233, and following of the Penal Code. Afterwards we caused to be brought before us the indicted prisoner, together with three other persons, chosen amongst those most resembling him. Randazzo chose to be the third in the line from the right hand of the observer. Afterwards the witness Nicolas Nicolosi (who stood in a separate room wherefrom he could neither see nor speak to any one) was introduced and the oath taken according to article 283 of Penal Code; he swore that he would say the truth and nothing else but the truth, and recalling to his mind the importance of an oath, the obligations incurred thereby, the obligation and penalties impending over perjurers and the reticent, we invited him to observe attentively, whether among the individu-

als standing before him, recognized the one of whom he spoke in his examination. Witness, after close attention, replied:

"The individual who is the third in the line is precisely the man to whom I allude in my examination."

The officers then stated that witness indicated the person of Randazzo.

Read and confirmed.

NICOLO NICOLOSI.
G. BATT. AMORMINO.
LUIGI CIMINO.

[SEAL.]

A true copy.
Palermo, 21 February, 1881.
The Chancellor:

Per DOMENICO BORGHESE,
V. Chancellor.

Deposition of sworn witnesses.

The year one thousand eight hundred and eighty-one, the twenty-first day of February, in the Office of Instruction of the Civil and Correctional Tribunal of Palermo.

Before us, Counsellor Tommaso Costanzo, judge in the aforesaid tribunal, assisted by the undersigned for the chancellor and sworn according to law, there came in obedience to summons the hereinafter-mentioned witness, who, being duly admonished on the moral importance of an oath in a religious point of view, and of the pains and penalties incurred by all persons guilty of reticence or bearing false witness as prescribed by Art. 365, 6, 7, and 9 of the Penal Code, and who, standing erect, has sworn to say the truth and nothing but the truth.

Being interrogated on generalities, and in accordance with Art. 172, he replied:

I am Nicolosi Luigi, aged 39, a native and resident of Lercara, a notary, and have no relations with the parties.

I went to Lercara on 4th Nov., 1876. On arriving at the R. R. station, I entered a car of the first train; two other cars were attached to the one in which I sat. As we approached a slight ascent, I noticed a man running across the fields in the direction of the train, and whom I afterwards recognized as Mr. John Forester Rose. I attached no importance to the fact, as I thought the man might be chasing a runaway horse, but he came alongside the car in which I sat, and then approached that in which sat his brother George, in company with Secretary Ingeraggiato, and exclaimed: "They want to seize me." Whereupon I perceived in the direction of the provincial road several horsemen. Then I alighted from the car to try and run away, but there came near to Mr. Rose another horseman, who said imperiously: "Let Mr. Rose get on horseback." I left and returned to take my seat in the car, when I perceived still another horseman leading a mare and holding a gun leveled towards the car in which I stood.

Mr. Rose was obliged to mount on horse and go with them. I heard no report of fire-arms, but afterwards I was assured that an explosion had been heard prior to Mr. Rose's approach to the train.

I did not notice the man who ordered Mr. Rose to get on horseback, so much was I terrified; the other horsemen, with leveled gun aforesaid, was a man wearing full black beard, and having a rather flattened nose; countenance rather pleasing, but somewhat timorous. I did not learn that Mr. George Rose and Mr. Secretary Inguaggiate had offered money to the brigand.

I should only feel confident of recognizing the horseman with flattened nose.

Read, confirmed, and signed.

LUIGI NICOLOSI.
TOMASO COSTANZO.
MICHELE ROSSI.

Examination of a sworn witness, the year one thousand eight hundred and eighty-one, the twenty-first day of February. In the office of Instruction of the Civil and Correctional Tribunal of Palermo.

Before us, Counsellor Tommaso Costanzo, judge, assisted by the undersigned for the chancellor, and sworn according to law, there came, in obedience to summons, the hereinafter mentioned witness, who being duly admonished on the moral importance of an oath in a religious point of view, and of the pains and penalties incurred by all persons guilty of reticence or bearing false witness as prescribed by article 365–6–7 and 9 of the Penal Code, and who standing erect has sworn to say the truth and nothing but the truth.

Being interrogated on generalities and in accordance with Art. 172, he replied:

I am Nicolosi Nicolo, aged 31, a native of Palermo, and resident of Cammarata. On the 4th Nov., 1876, myself, in company with John Forester Rose and George, his brother, British merchants, and Paul Ingnaggiato, chief accountent for the firm of Gardner, Rose & Co., went from Palermo by the first R. R. train in the direction of Lercara; arrived at the station, myself and Mr. John Forester Rose mounted horses, followed by Giovanni Losanio of Alia, valet to the said Mr. Rose; the two remaining parties took a carriage, however; myself and Mr. J. F. Rose struck the Frazzera Savacchotti, which is a short cut leading to the main prominent road, and distant a kilomotro from it. The carriage meanwhile was proceeding by a narrow road which leads into the national road. When about three metres from the aforesaid Frazzera we met two men on horseback and armed with breech-loading guns; they saluted us and feigned to move along on their way; when we had proceeded not many paces further we were confronted by the two other men coming from the provincial road, and armed also like the two former; I did not see them dismount, but undoubtedly they did so immediately on perceiving us, and promptly seized the reins of my horse, and of Losanio's; then it was that I could observe the two first-named horsemen, who were now at our backs holding their muskets levelled at us.

Mr. J. F. Rose waited with us, for he was impeded from making any movement by the two aforesaid malefactors; now one of the four brigands (and who appeared to me to be the chief) asked me my name; I promptly answered, "Niccolosi;" then he turned to Mr. Rose, and made the same inquiry, but before Mr. Rose had time to answer I interposed, his name is "Allessi;" but hereupon Mr. Rose thought proper to hasten his answer, and said: "My name is Rose." On hearing that name, the brigand ordered him likewise to dismount. The chief meanwhile, with pleasant expressions, encouraged and reassured us, and decided that Mr. Rose should mount a mare belonging to one of his men, who would exchange his animal with that of Mr. Rose; thus we were all compelled to go with the malefactors, taking the road that leads to Girgenti.

We were proceeding in this manner, Mr. Rose leading, and whose horse was being led by one of the brigands; myself and Losanio followed at a distance of about 70 meters and guarded by two other brigands.

The chief went alone, now in front and then in the rear, apparently taking precaution in his own interest, and when near addressing to us words of comfort.

As we advanced I perceived that Mr. Rose's horse was without him, and at same time saw him running at full speed across the country so as to make a direct line towards the aforesaid carriages, but as Mr. R. had about reached midway, the brigand who had led his horse now fired at Mr. R., fortunately not wounding him, and Mr. R. pursued his flight rapidly enough to gain the three carriages. Meanwhile the chief encouraged the brigand who had fired, and now both of them whipping up their steeds endeavored by taking different rout's to intercept the fugitive.

I observed that the carriage had stopped and that the two brigands had posted themselves one in front and one behind the same. Myself, Losanio, and the other two brigands arrived at the spot where the brigand had fired at Mr. Rose, and I saw that he had been remounted on another horse, and, accompanied by the two said bandits, took the path leading to the provincial road; myself and Losanio in charge of the other two bandits were compelled to follow.

We proceeded towards the road which leads to Girgenti, and after making about one hundred and fifty metres we turned into a cross-road to the left of the main road; we now came to a sort of trough where they watered the horses, and then we resumed our journey; we traversed the river Torto and came to a vast plain; as we neared the mountain skirts we had to go full speed, and although I showed that I was a poor rider (in order to gain time, and with time hoping some assistance), yet the brigands in their anxiety took pains to assist me in sitting on horseback, and I was obliged to keep up with them. I believe this acceleration was through interested motives, to avoid suspicion on the part of field laborers who were at work in the vicinity of our route.

In a little while the chief freely asked me if I preferred being confined with Losanio in some hut, in order that if being discovered by the government forces we should not be able to give any information or trace of the brigands, alleging that it would be a very good excuse for me; after this he changed his mind and liberated me and Losanio, pointing out the route we should take to regain Lercara. Before taking our departure I asked leave to see Mr. Rose and receive any orders he might have to give me, and this request was kindly granted. I found Mr. Rose prostrated, and had nothing to say except telling me to remember him to his brothers.

This is the whole story; nevertheless I feel it a duty to add the following particulars to further the ends of justice:

I was at first taken with fear, but afterwards gaining courage, even at the risk of my own life I made insinuations, and the chief told me that a large sum had been offered him when he approached the carriage, but as he could not be satisfied with the

100 thousand pounds which might be found in the carriage where was Mr. Rose's brother and Mr. Inguaggiate, so he had refused. It was, however, only a fancy of the chief that such said sum might be contained in the carriage; no such sum had been offered him by anybody, and whereas in the carriage there could not be probably over 6 or 7 thousand pounds. But this much Mr. Ingauggiate was, perhaps, trying to make me believe, as the pretentions of the brigands were different. He also told me that a letter would be sent to Palermo as to the whereabouts, but not to the family, but to intimate friends, and that the money would be half in gold and half in paper.

He was about 35 years of age, stature rather short, size regular, eyes lively, nose rather small, complexion brown, mustache dark brown, but ends lighter. His dress was a blue cloth jacket and vest *á la* sportsman. Wore gold watch-chain and gold rings.

I do not know any particulars of the man who led the horse of Mr. Rose, and neither anything about the two who escorted me and Losanio. The fourth individual was tall in stature, size rather slim, countenance rather ugly. Beard only on chin, very slight and blonde. Wore thick high shoes; dress like that of a farmer.

I now come to the horses; the chief rode a mare of chestnut color, of fine form, very spirited, and well trained; the animal had the bridle in the saddle; the other three were bays; the horse which Mr. Rose rode, belonging to the brigands, was one of the bays; the mare belonging to Mr. Rose was brownish, about six years old, and I should say of 1,200 pounds value. I state these things in furtherance of justice. In the aforesaid carriages were, besides Mr. Rose's brother and Mr. Inguaggiate, Messrs. Vincenzo Furitano, Luigi Nicolosi, Stefano Gianforme, Gaspare Romano, and others, whom I cannot remember. The announcement of our journey to Lercara was sent from Palermo on 2nd Nov., 1876, addressed to my father by a postal card in the handwriting of Mr. George Rose. It was in the ordinary course of things for Messrs. Rose to go and come frequently to and from Palermo to attend to the business of the five mines which they hold in bond near there.

I have no suspicions of anybody. Losanio, the valet, conducted the carriages to the R. R. station. On the 4th of November, 1878, everybody was aware of the return from Palermo of Mess. Rose, or at least everybody believed it, inasmuch as two lots (parcels) of sulphuret were expected. In the selection of these lots Mr. J. F. Rose and also Mr. Inguaggiato were always present.

Read and confirmed and signed by—

NICOLO NICOLASI.
TOMMASO CASTANZO.
MICHELE ROSSI.

Station of the Royal Carabineers of Alia. Section of Palermo. Verbal process. In the year of our Lord, 1877, to day, in the 22d of March, in Alia.

We, Ferraro Leonardo, commander of the Station of Alia, and the Carabineers which are undersigned with us hereby give, for the purposes of the law, the following account:

About 6 o'clock of the 20th inst., whilst the real estate owner Guccione Giuseppe, son of the late Francisco, aged 69, of Alia, was working in the vineyard of Partella del Lupo, in the territory of this commonalty, together with his, brother Anton, aged 52, and the son of Anton, called Joseph, aged 14, all residents of Alia, there appeared three unknown individuals, armed with double-barrelled guns, afoot, and their faces covered with hoods; the one of low stature, stout, bearing long moustaches and a short beard on hisc hin, the two other of common and regular proportions. They ordered the two last-named persons to lie down with the face toward the ground, and addressing the first-named one (Giuseppe Guccione), they asked him his name, and immediately shot him with their guns, inflicting two wounds, the one in the right thigh, perforating cavities and bowels, the other at the left shoulder perforating also cavities and the lungs, in consequence of which he died in the same instant. Then they took his watch, a silver one, worth 20 lires, a pocket-book containing a few lires, and then with a big pin they united his lips, a token that the murdered man had spoken to the damage of somebody.

As soon as the boy Joseph was free, he went to Alia, to give intelligence to the family; the family in their turn gave intelligence of the fact to the forces of the detachment, and the police deputy betook himself without delay to the spot, and after having verified the foregoing details, searches were made round in the farms and in the most suspected places, in order to get the three assassins, but in vain, because immediately after the deed they dispersed among the mountains.

The brother of the victim and his son were asked whether they recognized any of the malefactors, but they declared *pr*emptorily that they did not, and only were enabled to give the imperfect description as above stated.

The public voice is unanimous in designating as author of this crime the absconded Guiseppe Esposito alias Randazzo, aged 38, laborer from Alia, who was an enemy of the deceased because of the latter's public utterances; that, had he known some time before what reached his knowledge sometime later, about the assassination of a nephew of his, Dubolino Francisco, aged 30, resident in this commonalty, which occurred between the 12th and 15th of October, 1874, in Tostorese, Territory of Castromovo, Randazzo would have been at the present time in the penitentiary. Randazzo having thus acquired the conviction that Guccione supplied the police with information which led to his subsequent arrest. Therefore, it is not improbable that he might have committed the assassination associated with his notorious comrades, Leone Antonino and Salpietra Salvatore, the more, as after his escape from the prisons of Castromovo, it is rumored that he addressed some letters to the murdered man threatening his life. And there is talk, too, amongst the people of this land, of an interview having taken place between Randazzo and the man he afterwards killed, and that, through the interposition of a yet unknown person, a reconciliation had been secured between Randazzo and his victim.

The relatives of the murdered Guccione have suggested suspicion against the brothers Runfola, namely, the late Runfola Joachino, notary public, aged 52, the priest Vincent, aged 49, and Peter, aged 46, all from Alia, because of a lawsuit begun by the murdered man and still pendingagainst those three brothers, Runfola, on account of unlawful appropriation of a patrimony valued at 8,050 lires, this he did on his own and some of his relatives' behalf, so that these relatives are doubting if the assassination has been perpetrated by Randazzo, or by procurement of the Ranfolas, and therefore inquiries are still on foot in order to explain this mysterious matter.

Of the above statement double copy has been made to be delivered to the competent authorities.

Given in Alia, 22nd March, 1877.

FERRERIO LEONARDO.
RIZAMONTI FERDINANDO.
CARIMONI LUIGI.
MANZIONE IGNAZIO.
LENDONE GIUSEPPE.
MONTE CARLO.
FORMESSI ENRICO.
DON GIUSSEPPE.

A true copy.
Palmero, 21 February, 1881.
The Chancellor of the Tribunal:
[SEAL.]

Per DOM'O BORGHESE.

Post mortem examination, and other acts referring to the investigation.

In the year 1877, the 21st of March, at 9 o'clock a. m., in Alia, and at Portella del Lupo, in the Territory of Alia.

We, the advocate Rallo Josuah, pretor of the Department of Alia (pretorial jurisdiction), assisted by the Chancellor Torre Vito. Having been informed that at the above place there was the corpse of a person whose death is supposed to have been caused by some unknown violence, we conveyed ourselves to the spot, together with an escort of Royal Carabineers. The place is distant about 3 kilometers from our residence. Arrived there, after having given the convenient directions to carry out our operations in due order, and being assisted by Petruzzello Gioachino, an expert previously summoned, and who standing up before us, after instruction about the importance of an oath, the obligations contracted before God by the believers, and the penalties attaching to perjury or reticence, under the provisions of the articles 365, 366, 367, 369, Code P, sware according to the articles 298 and 299 of the Code of Procedure that he would say the truth and perform his duty honestly and to the best of his ability, and that he had no other aims but to make known to the police the pure and plain truth.

We observed in the first place the corpse of a man lying on his back in the midst of a vineyard, with a dog crouching near it on the right side close to it.

In the next place we noted that the corpse had the following garments: A black cap with tassel, a jacket, a waistcoat of olive colored cashmere, pants of the same stuff, a leather belt, long boots, a ribbon about the neck, torn, and no longer having a watch upon it.

The position and condition of the corpse may be described as follows: It lies on its back, and has a big pin stuck through its lips, by way of a lock or gag. The ground being inclined the head lies higher than the feet, the legs being apart.

The appearance of the corpse and garments gives the following results:

On the body are visible a contusion in the midst of the forehead, of irregular figure, 6 centimeter circumference, affecting also the connecting texture under the skin; another contusion on the bridge of the noise, with abrasion affecting also the cellular feature underneath the skin. Besides that, a big needle containing a cotton thread sticking through the lips and thus hermetically closing the mouth. Finally, a hole on the jacket, near the lower part of the right lung; and in the same way a corresponding hole on the waistcoat, another hole on the scapular region, another near the thigh on the right side.

So much having been ascertained, as we wanted to proceed to the recognition of the very corpse by means of two people acquainted with the killed man, we allowed them to appear, to take the oath according to the articles 297 and 299 Code of Penal Procedure, and all other requirements of the law having been complied with, they were interrogated and answered as follows:

1. I am the Licentiate Savio Giovanni, son of the late Joseph, aged 40, resident of Alia.

2. Cardinale Francisco, son of Gaetano, aged 44, from Alia, both relatives of the murdered man.

Having summoned them to observe closely the corpse, there present, and declare to whom it had belonged, they both, the one and the other, declared:

"This corpse, which are asked to identify, is that of him who being alive was called Joseph Guccione, son of the late Francisco, aged (omitted), husband of Barbaa Russo, native and resident of Alia."

They did not sign, because of being uneducated.

G. RALLO.
TORRE CARMELO.

Thereafter using the due precautions, the corpse was allowed to be undressed and his garments to be wrapped up, duly closed, and secured with the seals of black sealing-wax, with attached a scrap of paper bearing the information; garments worn by the murdered Guccione Giuseppe.

Thereafter, assisted by the aforesaid experts, we took note of the following injuries on the corpse:

A wound in the cavity of the left armpit of a circular shape, size, and 6 centimeters, with correspondent issue on the superior edge of the correspondent shoulder-blade, and having also a circular form, and still bleeding from its outbending edges.

Another wound about the middle of the right shoulder-blade, figure circular, borders burned out and turned inwards.

Another wound at the interior side of the right thigh, extending through the cavities having burned-out borders, bleeding; shape, circular, in size like the first above described.

Thereupon in order to ascertain what might have been the cause which produced the death of the individual to whom said body belonged, at what more or less recent time such death might have occurred, and if it followed in consequence of one, or of all the injuries stated, whether before or after their infliction, on account of other causes besides those injuries, independent of the criminal deed, we allowed the said expert to report about said circumstances, permitting, if necessary, the autopsy of the body.

The same expert, after a convenient examination, performed in the presence of the officers, made the following statement:

The examination of the wounds visible on the surface of the corpse of the said Giuseppe Guccione made it seem convenient to make in the first place the autopsy of the thorax, which proved the fracture of the omoplate, the perforation of the right lung, the splintering of the spine at the second vertebræ, the expulsion of marrow from the head, the perforation of the superior lobe of the left lung, the destruction of a great part of the tissues of the left humeral articulation.

There was found broken, besides, the neck of the shoulder bone on the same side, and the ligaments of the said articulation.

Having opened the abdominal cavity, the right ileus bone was found broken, and the bladder, the rectus, and portion of the crassus perforated.

It has been thought advisable to forego the opening of the skull, inasmuch as the cause of the death is sufficiently apparent.

The autopsy as made shows that the wounds were inflicted by gun-shots some 24 hours ago, at a short distance, and that they produced the immediate death of the unfortunate Guccione.

Of all which we have drawn up this verbal process, and after the reading and confirmation of it, the same was signed by the parties.

PETRUZZELLO JOACHINO.
ROLLO.
TORRE.

True copy.
Palermo, 21st February, 1881.
For the Chancellor.
[SEAL.]

DOMENICO BORGHESE, *Vice Ch.*

Examination of a sworn witness, in the year 1881, the 20th of February, at the office of the civil and correctional tribunal of Palermo.

Before us, Chevalier Tommasso Costanzo, judge, assisted by the chancellor substitute, appeared according to summons the undersigned witness, and who standing up before us, after instruction about the importance of an oath, the obligations contracted before God by the believers, and the penalties attaching to perjury and reticence under the provisions of the articles 365, 366, 367, 369, Code P., swore according to the articles 298 and 299 of the Code of Procedure that he would say the truth and nothing else but the truth; being asked the usual questions, including those prescribed by article 172, witness answered:

I am Guccione Giuseppe, son of Antoinno, age 14, peasant, as already described in the documents. I voluntarily appear to make the following revelation to the police:

In the course of the last few days, owing to the fright caused by the assassination of my unfortunate uncle Giuseppe, at the 20th of March, I got sick. To-day, however, feeling stronger, I recognize it to be my duty to reveal the names of the two assassins who committed the horrible deed. They are Esposito, alias Giuseppe Randazzo, and Pietro Runfola, son of the late Antonino, alias Ciciraro; whilst the third one remained unknown to me. My recognition of the murderers happened under the following circumstances:

I had left the vineyard in Portella del Lupo, where my father and my uncle were occupied in dressing the vines at 23, 1–2 o'clock (ancient Italian time). My father and my uncle ordered that I should assemble the animals which were pasturing at some distance, and saddle them in order to return home.

As I followed the path where I had left the saddle I encountered Randazzo sitting near it, who had shaved off his moustaches and beard on the chin; I asked him what he was doing there, and he answered: Toli anu, "cut short," and as he spoke thus, he held his double-barreled gun in position to fire. I was astonished because of his presence there, as I recollected some facts occurred in occasion of the assassination of a nephew of my uncle Joseph, that Randazzo, who had been arrested thereafter, believed himself to have been imprisoned through the interference of said uncle of mine, Joseph; that after his evasion from the jail of Caccamo he more than ever infested the neighborhood uttering his feeling of revenge against my uncle, as well through threatening letters, as by setting fire to a country house and a hamlet; that my uncle, owing to the fear which this inspired him with, abstained from going in the country; that he went there on the 20th of March, as he thought that the tranquillity of the land was no more disturbed; that spying out the whereabouts of my uncle, Randazzo came to that place with Pietro Runfola, and with the third unknown man, with the purpose of accomplishing his criminal purpose.

In order to confirm my precedent statement, I declare that as soon as I noticed the said Randazzo, armed, near the saddle, and subsequent to his answer, Foliamo, I returned to give intelligence to my uncle; and as I had walked at a distance of gun-shot, I perceived besides the said Randazzo two other individuals, likewise armed with double-barreled guns; one of the two was unknown to me, and the other seemed to me by his carriage, height, garments, to be Pietro Runfola, whom I observed not in front but sideways. They approached my said uncle and my father at the distance of half a gun-shot, and Randazzo with his impetuous voice, addressing the said uncle of mine, said to him he might consider himself already captured; the unfortunate uncle of mine answered, "O, traitors, how you treat me; do you not remember the good I did you?"

After that utterance Randazzo the first exploded his gun; after him two shots were fired by the other individual, which I deem to be Runfola himself, whilst the third one, whom I did not know at all, stood aside.

After some interrogation he replied, I can only reaffirm what I have said as to their having shot several times at my uncle Joseph, but I could not be aware of the stealing of the watch, nor did I witness the perforation of his lips with the needle.

Read and confirmed and subscribed by the officers only, the witness being ignorant.
[L. S.]

TOMMASSO COSTANZO.
MICHEL ROSSI.

Examination of a sworn witness, in the year 1881, the 20th of February, in Palermo at the office of the civil and correctional tribunal.

Before us, Chevalier Tommasso Costanzo, assisted by the substitute of the Chancellor, appeared, pursuant to previous summoning, the undersigned witness; and who, standing up before us, after instruction about the importance of an oath, the obligations contracted before God by the believers, and the penalties attaching to perjury or reticence under the provisions of the articles 365, 366, 367, 369, Code P., swore, according to the articles 298 and 299 of the Code of Procedure, that he would say the truth and perform his duty honestly and to the best of his ability, and, after suitable interrogatories, witness answered as follows:

I am Guccione Maria, daughter of Francesco, aged 48, native and resident of Alia, wife of Giuseppe Maratuso, sister of the murdered Giuseppe Guccione.

Some days after the barbarous assassination of my unfortunate brother, Joseph Francesca, daughter of unknown parents, widow of Bartolomeo Ruffino, the sister of the fugitive, Joseph Esposito, alias Randazzo, called at Giuseppa Alessandro's home, opposite to the house of notary public Runfola, in order to get information about the murder of my brother. She asked what the relatives of the killed man were thinking about, if the boy Guccione had recognized some of the murderers; and being ascertained that the public voice accused her brother, Randazzo, she replied thus: "My brother cannot have been the killer of Guccione, and, if ever, he did it under the instigation of somebody else," but she would not at all declare who were those instigators.

Guiseppa Alessandro herself gave me this information, and she might be heard about this circumstance, but I think she will be afraid to speak about it. I must, besides, declare that on the morning when my unfortunate brother's corpse was taken home, the priest, Runfola Vincent, a brother of the notary public, Joachim Runfola, showed himself delighted, merry, and content in a manner that amazed many people, among others Jiacome Maracluso, who might be examined about it by your honour, provided he will speak, as their reigns in the land a great fright on account of the family Runfola, who are feared very much.

Read, confirmed, signed by officers only, witness being ignorant.

[SEAL.] TOMMASSO COSTANZO.
MICHELO ROSSI.

Examination of a sworn witness, and taking of oath, in the year 1881, 20 of February, in Palermo, at the residence of the tribunal.

Before us, Chevalier Tommasso Costanzo, judge, assisted by the substitute chancellor, appeared the undersigned witness, and who, standing up before us, after instruction about the importance of an oath, the obligations contracted before God by believers, and the penalties attaching to perjury or reticence under the provisions of the articles 365, 366, 367, 369, Code P., swore, according to the articles 298 and 299 of the code of procedure, that he would say the truth and nothing else but the truth, and after the usual interrogatories answered as follows:

I am Guccione Antonino, son of the late Francesco, brother of the murdered Guccione Guiseppe; in continuation of my precedent declarations, I feel that it is my duty to make known to the police that one of the assassins of my unfortunate brother was the notorious fugitive Esposito Gusseppe, *alias* Randazzo, and if I did not sooner reveal it to the police, it was only owing to my fear of endangering my own life, as on the very same day, the 20th of March, 1877, at the very spot of the occurrence, the aforesaid Randazzo, after the assassination of my brother, under actual threats of assassination, ordered me to keep silence about it, to abstain from revealing his name to the police, that I should remember my condition as the father of a numerous family, and if I disobeyed, he would come to kill me in my very home. It is true that as soon as he reached the spot Randazzo said to my brother Joseph that he was already captured, and that the unfortunate answered, "O, traitors; how you treat me, you forget all the good I did you."

After that, Randazzo first discharged his gun at my brother, and other shots followed from other individuals unknown to me, who stood at the side of Randazzo, and the third individual, likewise unknown to me, stood aside; these two companions of Randazzo I did not at all recognize, and held them for two foreigners; they might have been truly two people of the same place, but I was so frightened that I could not recognize them.

My son Joseph did not make me any confidence about his recognizing the murderers, and only said he had known and spoken with the said Randazzo. I did not notice the stealing of the watch from the waistcoat pocket of my brother, neither the sticking of the needle in the lips intended to close the mouth.

Before the assassination, on a day I cannot determine, a certain Anna Maria Chimenti

alias Verticchio, called at the home of my sister Mercuria, wife of Mormine Francisco, complaining and protesting against the charge uttered by my unfortunate brother against her brother Chimentis and also against Randazzo, but I cannot tell with assurance if they were present at the killing, because, frightened as I was, as I said before, I did not stop to recognize them.

The brethren Chimenti are in intimate relation with the notary Runfola Giachini, as they keep some pieces of land belonging to him, as lessees, and because their sister Anna Maria lives in unlawfal cohabitation with the notary; besides that a lawsuit is pending in the tribunal of Termini on behalf of private business with my unfortunate brother, Joseph, so that I am not without supposing that the said notary might have instigated the said Chimentis with reference to the affair of the burnt house, to the assassination, in order to get rid of my brother, they taking as their assistant the said Randazzo, who is a cousin of the Chimentis.

I have nothing else to tell to the police about the matter.

Read, confirmed, subscribed only by officers, the witness being uneducated.

[SEAL.]

TOMMASSO COSTANZO.
MICHELE ROSSI.

Declarations and examinations of sworn witnesses against Guiseppe Esposito, alias Randazzo, accused of having committed extortion by detention of the person, in the territory of Termini Imerese, on the 15th of May 1877, to the injury of Antonino Formusa.

Residence of the command of the Rural Guard Corps in Termini Imerese.

TERMINI IMERESE, *May* 15th, 1877.

Detention of Mr. Antonino Formusa.

To the very Honorable, PRETOR OF MANDEMENTE,
Jurisdiction District of the Pretor of Termini :

Yesterday evening, about 9 o'clock p.m., Mr. Nicolo Formusa presented himself before this command, complaining that his brother Antonino had not yet returned from the country, at that hour, and that he suspected some foul occurrence. The same Formusa said that his brother conveyed himself yesterday to an estate at Dispensa, near Fridda, distant 5 kilometres from Termini.

The undersigned hastened then to collect nine guards, partly on horseback, partly afoot, which, together with Mr. Francesco Formusa, the brother of the above mentioned person, went to the place, and having knocked at the door of the house in the aforesaid estate, the way leading toward Cerda, answer was given by Ignazio Calderone and by two other persons, whose names are unknown, who worked there; they opened the door and declared that about 6½ p. m. 4 individuals afoot, the face uncovered, armed, the one with a double-barreled gun, the other with a single-barreled one, had by violence frightened and wakened them up with Formusa in that very house, with orders to keep silent, and that about 8½ p. m. they took Formusa, put him on one of his mules, a bay colored one, and three of them went with him, whilst another of them remained behind the door, threatening the peasants if they dared to go out. The guards, convinced that an abduction had been committed, sent me notice of the fact immediately, and I happened to give intelligence of it to the brigadier of the station-house of Termini, and to the marshal of the royal carabineers, that they might despatch the necessary force for the arrest of the brigands.

The guards, together with Mr. Francesco Formusa, the brother of the abducted man, started out to discover traces, but so far results are unknown.

There were also sent by this command two other guards to the municipality of Caccamo, to advise that police force be ready to move to the mountain of St. Calogero, where the malefactors are supposed to have taken themselves.

On the basis of the personal descriptions given to the police, the brigands are supposed to be from Caccamo.

The 1st. Stout in person, rather low sized, swarthy, with black whiskers, *the face somewhat pitted*, clothed in dark, wearing high white bots reaching the knees, black bonnet without tassel, armed with a double-barreled gun, aged about 45.

The 2d wore also black whiskers, his size being about the same as that of the first mentioned, more slender body, dark face, dressed like the other one, aged about 40, armed with a single-barreled gun.

The 3d one, aged about 25, without beard, florid complexion, tall and slender, was dressed in dark-colored clothes, black cap, white boots, and armed with a double-barreled gun.

The 4th, aged about 25, tall, slender, swarthy face, wore an olive-colored velvet coat, trimmed with leather at the shoulders, on the elbows, under the knees, and between the legs, red cap without tassel, armed with double-barreled gun.

The undersigned, who communicates these details to you, however, will duly pursue the investigation and continue his reports at every emergency.

The Chief: ANTONINO D'ASSARO.

True copy.
Palermo, 21 February, 1881.
The Chancellor:
[SEAL.] Per DOMENICO BORGHESE.

Province of Palermo, District of Termini Imerese, Commonalty of Termini Imerese.
Corps of the rural guards:

In the year 1881, May 17, at Termini, we, Antonio Dissaro, chief of the rural guards of the commonalty of Termini, assisted by our Secretary Luigi D'Assaro, having been informed about the abduction of Mr. Antonino Formusa, went with our force to the exfeud Scacceapedocchio, on account of the serious suspicion which had arisen against the peasant Loreto Geraci Esposito from Cerda, attendant of Messrs. Formusa Brothers, as the organizer of said abduction, in accord with the band Leone and that of Caccamo.

Our inquiries were without result, because he fled to Cerda, perhaps subsequent to some advice which he might have received a few minutes previous. Some of my guards, and some soldiers from Cafelu, searched the neighborhood, happened to secure him in the Territory of Cerda. He was conducted before us, and asked whether he knew anything about the detention of his master, Mr. Formusa Antonino. He declared in the presence of the soldiers from Cafalu, Fedele Messina, Micciancio Carmelo, Gerais Luciano, D'Angelo Giovanni, and our guards, Gullo Mariano, Albanesi Antonino, Paci Luciano, Insiuga Fillipo, Cacolici Guiseppe, Pasateri Ignazio, and one confidential agent of mine, whose name is Francesco Passamonte, from Cerda, that he had been the organizer of the abduction, acting in accord with the above said bands, and previous to the abduction he talked it over with them, they telling him that in order to avoid the discovery of their dealings, the animals should be trusted to Vito Andolino, aged 45, to Rasoline Militello, both from Montemaggiore, and horsekeepers at the exfend, Baccogna and attendants of Militelli Brothers, and Gioachino Saeli, from the same village. They told him also that they would hide themselves in Baccogna, awaiting a signal from him for the execution of the plan.

Indeed, said Gerace said that in the morning on which the abduction took place, he conveyed himself on horseback to the exfeud Tozzisiacchi and thence to Giardinazzo, where he advised the four kidnappers that it was the right time for the move, as Formusa was with few peasants on an estate of his called Despenza, near Friddi. From this last place he passed to Baccogna to advise the remainder of the Leone band that everything was ready. He said also that on his return the malefactors, passing by the dwelling of Scacciapedocchio, communicated to him that the abduction was accomplished, and that they were going with the captive to the wood called Chiuso, near Collesano.

Geraci Lareto promised in our presence that he would indicate the place where Formusa had been taken and still was together with the band.

Therefore it proved absolutely indispensable to confide Geraci to the forces of Cafalu, as the place to be discovered belonged to the District of Cafalu, in order to carry out the seizure of said band, the rescue of Formusa.

On the basis of Geraci's assertions we went to Baccogna; we there found in fact in the house on straw beds on which the brigands passed the night the eve before the abduction, that is to say, the 14th instant; the above said Andolino and Militello confirmed what Geraci had narrated as to the animals and their night halt at that dwelling. We secured also Leonardo Di Novo, son of the late Cossino from Termini, who was watching with a view of assisting the flight of Geraci Lareto, as he was a very intimate friend of his, and also because of his contradictory statements about his whereabouts, for, inquired of by us what he was doing there, he answered that he came from Bonfornello, where he had to make bread, while a woman, Francesca Lo Bello, whom we encountered, told us that Di Novo had not made bread for more than a year, but supplied himself with bread from Termini.

For all these reasons, and owing also to his bad antecedents, we secured Di Novo, together with Andolino and Militello, and we sent them to your honor to await the result of operations of soldiers, intended to arrest the brigands and rescue Mr. Formusa.

After the reading of this verbal process, the above said guards subscribed the same with us and our secretary, excepted only Pasotori, Catanese, Coacolici, and Passa-

mente, our confidential agent, because of their being uneducated, and made the sign of a cross.

(Signed by a cross.) + POSATERI IGNAZIO,
" " + CATANESE ANTONINO,
" " + COACOLICI GUISEPPE,
" " + POSSAMONTE FRANCESCO,
FILIPPO INSEGRA,
Guard on horseback.
LUCIANO PACE, *Idem.*
MARIANO GALLO, *Guard a'foot.*
[SEAL.] LUIGI D'ASSARO, *Secretary.*
ANTONINO D'ASSARO,
Chief of the Rural Guards.

True copy.
Palermo, 21 Febr., 1881.
The Chancellor:
Per DOM. BORGHESE.

Examination of a sworn witness, in the year 1881, the 20th of February, at the office of the Tribunal of Palermo.

Before us, Chevalier Tommasso Costanzo, judge of the tribunal, assisted by the undersigned substitute to the chancellor, and after having taken the oath in accordance with the law, appeared, in pursuance of a previous summons, the undersigned witness, who, after having been reminded of the importance of an oath, and of the obligations assumed by the believers, and of the penalties for perjury or reticence under the provision of the articles 365, 366, 367, 369, of the penal code, swore, standing up, that he would tell the whole truth and nothing but the truth; and being asked the usual questions, all those prescribed by the article 172, he answered:

I am Calderone Ignazio, aged 49, from Termini, peasant, and attendant of Formusa brothers, called Nicolo Antonino and Francesco. In the afternoon of yesterday, towards 6 p. m., I was coming back to Dispensa. I had to join Formusa Antonino, and I was on horseback. At once, near Palmento's hamlet, somebody unknown to me grasped the bridle of my mule. It was a man armed with a gun, and I deemed at first that it was only a joke, so that I told him not to bother me that way; but at once he pulled me by the leg, making me fall to the ground and threatening to kill me. He took me to the cottage, where I was surprised to meet my master, Antonino Formusa, sitting on a basket, and watched by a brigand.

I understood then that it was an abduction for the purpose of extorting money, and began to tremble with fright. Few minutes later I saw Carlo and Guiseppe Arrigo, attendants of Formusa, who were led there by two other brigands. The tallest of the malefactors summoned Antonino to stand up. Antonino was reluctant at first, but partly because threatened with death and partly by being pulled up he had to resign himself. He was put on the mule, and we were locked up in the cottage. Looking through the keyhole, I observed that they took the direction toward Giardinazzo. I observed that the four brigands watched us from the outside and repeatedly cried out "be silent, and do not stir, otherwise I will set fire to the house and burn you down. Remember that you have children to feed."

After two at night (Italian time) some time, we heard no more the voice of the brigand, but did not dare on account of our fright to move. After a while, we heard the voice of Antonino's brother, who called: "Ignazio, Ignazio, where is my brother?" It was Francisco Formusa, accompanied by his nephew Lorenzo Batsaghia. I tried then to open the door, which finally I opened, and told the sad story to the relatives of the captive. We took immediately the direction toward Termini, together with the brother Arrigo.

I did not recognize the malefactors, and I feel sure they were not from Termini. Their talk allowed me rather to believe that they were from a place not far off. I think I could recognize them, as I saw them in front, and I give their personal description as follows:

The first, a stout person, rather low sized, swarthy, with black whiskers, the face somewhat pitted, clothed in dark, wearing high white boots reaching the knees, black bonnet without tassel, armed with a double-barreled gun, aged about 45; the second wore also black whiskers, his size being about the same as that of the first mentioned, more slender body, dark face, dressed like the other one, aged about 40, armed with a single-barreled gun; the third one, aged about 25, without a beard, florid complexion, tall and slender, was dressed in dark-colored clothes, black cap, white boots, and armed with double-barreled guns; the fourth, aged about 25, tall, slender, swarthy face, wore an olive-colored velvet coat, trimmed with leather at the shoulders, on the elbows, under the knees, and between the legs, red bareta cap without tassel, armed

with a double-barreled gun. All had boots of the Neapolitan style, without spurs; but I suppose they had somewhere else their beasts, because such a people do not walk a-foot, and I was not surprised seeing them without spurs, as it would prove impossible to walk with them in the vineyards. No suspected persons had haunted the locality where the abduction took place, except Esposito Lareto, *alias* Merlo, who from childhood had been in the service of Formusa, and was a watchman at the exfeud of Scacciapedocchia.

Esposito is a man of ambiguous behaviour, and several times Antonio had to scold him thus: "This hog, this rascal, I cannot rule him." Some time ago Formusa scolded him because I had seen him going round with a gun, and he forbade his doing so. After that reproach Esposito disappeared for eight days, without and advice to anybody, and returned afterward to his services. They say that he had been in Montemaggiore with his concubine.

Nicolo Formusa is able to give a fuller account of Esposito's conduct; I only add that having been charged by the master to look after Esposito, this morning he inquired about the health of the master as usual; I did not say a word about the occurrence, but he understood my reticence. He looked unconcerned; anyhow, I could not read in his heart.

I heard that yesterday Esposito had been seen on a horse belonging to Formusa in Giardinazzo and Cozzisacchi, but it seems he was there in order to have the mare mounted by a stallion.

I remember that the malefactor, whom I described as pitted on the face, before leaving said to me, "tell your master to have the money ready"; but he did not appoint the place to which to take it, nor the amount wished for.

After the reading, this verbal process was undersigned only by the officers, witness being uneducated.

[SEAL.]

TOMMASSO COSTANZO.
MICHELE ROSSI.

Statement of a sworn witness, in the year 1881, the 20th of February, at the office of the tribunal of Palermo.

Before us, Chevalier Tommaso Costanzo, judge, assisted by the undersigned substitute of the chancellor, and after having taken the oath in accordance with the law, appeared in pursuance of previous summons the undersigned witness, who, after being reminded of the obligations assumed before God by believers by an oath, and of the penalties for perjury and reticence, by articles 365, 366, 367, 369 of the penal code, swore, standing up, that he would tell the truth and nothing else but the truth; and being asked the usual questions, all those prescribed by article 172, he answered:

I am Guiseppe Arrigo, son of Salvatore, aged 26, native and resident of Terrasini, peasant; the 15th of May, 1877, I was working with my brother Carlo, as usual, at the exfeud belonging to my master, Antonino Formusa, called Dispensa, in Brucato, at about 23 o'clock (Italian time), I was leaving in order to join my master, when I saw four people descend the bridge over the way and come toward my master's rural dwelling. Two of them, when distant about 5 steps, said to us, "Friend, if you please, we have something to say to you." Then they added: "Throw away the bundle of grass," and we answered, "We can as well listen with our bundle of grass"; but they assaulted us and compelled us to pass before them, threatening to kill us. My brother asked where we had to go, and they said, to the rural dwelling. As we arrived there we met there Calderon Ignazio and our master, Mr. Farmusa, sitting inside; there I saw the two other people, who had crossed the bridge, all armed with guns; three of them with double-barreled guns and one with a single-barreled gun; all wore long boots of the Neapolitan style; three of them wore jackets of blue cloth, the fourth a velvet one and a red barretta cap. All spoke with a rough voice, so that their talk would not be understood; but the matter of it was the abduction.

My master showed himself haughty, and was reluctant to dress himself, because he shared the suspicion verified by such circumstances; but the tallest of the brigand addressed him, "Go on speedily, otherwise I fire." Then he went outside; myself, my brother, and Calderone were locked up and threatened with death if we made any noise. I saw through a fissure of the door that they helped Formusa to mount on a mule which stood outside and belonged to Formusa, and on which Calderone had come back a few minutes before. I observed that they also blindfolded him. One of the brigands remained to watch us, and at some intervals he cried out, "By the blood of the Madonna, if you get out I kill you!"

We stood there full four hours of our time (Italian style). We did not dare to get out for fright; but we opened as soon as we heard the voice of Francesco Formusa, Antonino's brother. Then we returned to Termini, and Mr. Francesco Formusa, with Mr. Lorenzo Bassaglia, his nephew, remained. I do not know what for.

The brigands who came to me and toward my brother wore no beard; the one was

dressed in velvet jacket, his head with a red barretta without tassels, the other one had a black one without tassel. Both had on long boots, and were armed with a double-barreled gun. The one who wore the colored barretta was aged about 25, the other one about 45; the third one, with a single-barreled gun, was about 27.

I do not suspect anybody known to me, as I did not know them, and besides because I have never known of any suspected persons haunting the neighborhood.

I cannot determine to what part of the country they belonged, but I am positive, and so affirm, that they were not from Termini.

I cannot tell anything else to the police.

After having read and confirmed this verbal process, we signed, except witness, he being uneducated.

[SEAL.]

TOMMASO COSTANZO.
MAGNO GUISEPPE.

LEGATION OF H. M. THE KING OF ITALY.

WASHINGTON, *March 30th*, 1881.

Mr. SECRETARY OF STATE: The Royal Government has received information that Giuseppe (Joseph) Esposito, surnamed Randazzo, a dangerous criminal, who made his escape September 5th, 1878, while being taken from prison to the Court of Assizes at Palermo, is now living at New Orleans.

I herewith enclose two warrants, dated respectively April 16th, 1878, and December 7th, 1880, which have been issued for the arrest of the person in question by the criminal section of the court of appeals at Palermo. These documents contain a statement of the reasons for which the arrest of the accused is ordered, and are accompanied by the testimony in accordance with which they were issued.

It appears from these documents that Giuseppe Esposito, surnamed Randazzo, is charged (V. Doc., marked A):

1. With having belonged to a band of criminals.
2. With an attempt to get possession by violence, of the sum of 255,000 francs, and to kidnap a person.
3. With the theft (for which purpose violence was used) of 40,000 francs, with kidnapping, and attempted murder.
4. With premeditated murder.
5. With the theft, by violence, of 8,000 francs, and with kidnapping.

In Doc. marked B:

1. With premeditated murder.
2. With the theft, by violence, of 30,000 francs.

As these crimes and offenses are among those for which extradition is to be granted, according to paragraphs 1, 2, and 4 of Art. II, of the convention of March 23, 1868, between Italy and the United States, I beg you, Mr. Secretary of State, to cause a warrant to be delivered to me for the arrest and extradition of Giuseppe Esposito, surnamed Randazzo.

I gladly avail myself of this occasion to renew to you, Mr. Secretary of State, the assurance of my very distinguished consideration.

CAMPOREALE.

To the honorable JAMES G. BLAINE,
Secretary of State.

LEGATION OF H. M. THE KING OF ITALY,
Washington, September 14, 1881.

The honorable the SECRETARY OF STATE:

SIR: In referring to my note, dated March 30th last past, and to your reply to the same of March 31st, I have the honor to request, in conformity with the treaty of extradition between Italy and the United States, under date of March 25, 1868, that the individual named Giuseppe Esposito, alias Randazzo, be delivered into my custody in order that he be transported back to Italy.

The documents upon which this demand for extradition is based ought to have been forwarded this day to the Department of State, by United States Commissioner Osborn, who, after careful examination of the same, and after having duly fulfilled all the formalities prescribed by Article VI of aforementioned treaty, has recognized there being just grounds for said demand.

I take this occasion, Mr. Secretary, to renew to you the assurance of my distinguished consideration.

CAMPOREALE.

UNITED STATES COMMISSIONER'S OFFICE,
SOUTHERN DISTRICT OF NEW YORK,
New York, Sept. 17th, 1881.

Hon. JAMES G. BLAINE,
Secretary of State, Washington, D. C.:

SIR: I forward this day, per Adams Express, the record of the extradition proceedings against Giuseppe Esposito, alias Randazzo, under the treaty with Italy, pursuant to chapter 66, U. S. Revised Statutes, relating to extradition, &c.

Your obedient servant,

JOHN A. OSBORN,
Commissioner.

DEPARTMENT OF STATE,
Washington, March 31, 1881.

Prince de CAMPOREALE, *&c., &c., &c.:*

PRINCE: I have the honor to acknowledge the receipt of your note of the 30th instant, with its inclosures.

You request in the name of your government that a warrant may be granted for the arrest of Giuseppe (Joseph) Esposito, surnamed Randazzo, who is charged with the crimes of murder, attempt to commit murder, and robbery; and is alleged to be a fugitive from the justice of Italy and to have taken refuge within the jurisdiction of the United States.

In compliance with this request, I transmit a warrant of authorization for the arrest of the party in question, in order to an examination into his criminality in respect to the crimes with which he is thus charged, with a view to his surrender to the Italian Government, for trial, in case the results of such examination shall be found to justify his extradition in accordance with existing treaty stipulations between the United States and Italy.

Supposing, as I do, that the documents and proofs accompanying your note may be found necessary for use in the course of the preliminary examination, I return them herewith for your convenience on that occasion. When the necessary documents shall have been returned to this department by the examining magistrate the warrant of surrender will be issued, in case the results of the examination shall be found to justify it.

Accept, prince, a renewed assurance of my high consideration.

JAMES G. BLAINE.

(Inclosures:) 1. The warrant mentioned; 2. The papers referred to.

DEPARTMENT OF STATE,
Washington, Sept. 19, 1881.

Prince CAMPOREALE, *&c., &c., &c.:*

PRINCE: I have the honor to acknowledge the receipt of your note of the 14th instant, and in reply transmit the warrant which you require for the surrender into your hands of Giuseppe Esposito, alias Randazzo, a fugitive from the justice of Italy, charged with murder.

Accept, prince, a renewed assurance of my high consideration.

W. HUNTER,
Acting Secretary.

(Inclosure:) Warrant, dated 19 Sept., 1881.

47TH CONGRESS, 1st Session. } SENATE. { EX. DOC. No. 21.

MESSAGE

FROM THE

PRESIDENT OF THE UNITED STATES,

TRANSMITTING

A report of the Secretary of State in relation to the necessity of modifying the present system of consular jurisdiction of the United States in the countries of the East.

DECEMBER 19, 1881.—Read and referred to the Committee on Foreign Relations and ordered to be printed.

To the Senate of the United States:

I transmit herewith to the Senate a report of the Secretary of State in relation to the necessity of modifying the present system of consular jurisdiction of the United States in the countries of the East. I regard this subject, to which I have adverted in my general message to Congress, as one deserving the earnest attention of the national legislature.

CHESTER A. ARTHUR.

WASHINGTON, *December* 19, 1881.

To the President:

In your annual message, presented to Congress on the 6th instant, the following passage occurs:

> In relation both to China and Japan some changes are desirable in our present system of consular jurisdiction. I hope at some future time to lay before you a scheme for its improvement in the entire East.

In obedience to your request, I have the honor to present to you, in as brief compass as practicable, the general circumstances which make a change desirable, and the direction which such a change might profitably take.

It is, in the first place, to some extent uncertain how far the constitutional authority permits the erection in foreign lands of tribunals of justice, which have no counterpart in our domestic system founded on the same constitutional authority.

The Constitution provides that—

> The judicial power of the United States shall be vested in one Supreme Court, and in such inferior courts as the Congress may, from time to time, ordain and establish. (Art. III, sec. 1.)
>
> The judicial power shall extend to all cases, in law and equity, arising under this Constitution, the laws of the United States, and treaties made or which shall be made under their authority * * * to all cases of admiralty and maritime jurisdiction; to controversies to which the United States shall be a party; to controversies * * * between a State, or the citizens thereof, and foreign states, citizens, or subjects. (Art. III, sec. 2.)

The powers of Congress to create new tribunals and to define the laws of which they shall have cognizance are elsewhere laid down thus:

> The Congress shall have power * * * to constitute tribunals inferior to the Supreme Court.
>
> To define and punish piracies and felonies committed on the high seas, and offenses against the law of nations. (Art. I, sec. 8.)

It is further provided:

> The trial of all crimes, except in cases of impeachment, shall be by jury; and such trial shall be held in the State where the said crimes shall have been committed; but when not committed within any State the trial shall be at such place or places as the Congress may by law have directed. (Art. III, sec. 2.)

The treaty-making function of the Government of the United States having concluded engagements with certain powers in the East, whereby extraterritorial jurisdiction was secured for American citizens within the territorial domain, and American shipping within the waters, of such powers, the Congress, assuming to act under the authority of Article III, sections 1 and 2, of the Constitution, extended the judicial function of the United States to those countries, within the treaty limits, by investing certain diplomatic representatives and consular officers there with judicial powers. The statutory enactments made at various times to this end are found collected in sections 4083 to 4130 of the Revised Statutes.

A minute analysis, step by step, of those provisions of law would be neither profitable nor practicable in the present report. It seems necessary to do but little more than consider the fact that the consular powers and procedure vary materially from those at home; that the safeguard of trial by jury disappears, and that appellate proceedings are either not allowed, or follow new channels. Hence the question has at times been mooted, both by the Executive in review of consular procedure, and on the floor of Congress in debate, whether a consular officer is rightly made a court or tribunal within the terms of the Constitution, and whether the constitutional guarantees are secured to the accused. It has been ably maintained that the provisions of treaties are permissive only, not creating an obligation as toward the country within the borders of which a tribunal is established, but bestowing a privilege to be exercised in favor of American interests therein; and that, consequently, in taking advantage of such permission, Congress neither obtains the right by treaty, nor possesses the right under the Constitution, to resort to forms of law unknown to the Constitution or prohibited by it.

I do not desire to be understood as contending, or even explicitly admitting, that our legislation respecting consular courts in foreign parts is unconstitutional. But it is certain that the doubts which have been advanced as to its constitutionality are at least worthy of due consideration in deciding upon modifications of the system, in order that all chance of erroneous interpretation may be duly avoided. It will, for instance, be well to examine whether the superposition of the personal function of a judge upon the personal function of a minister or consul is the constitution of a tribunal of justice inferior to the Supreme Court, within the terms of the Constitution; whether the fact that the jurisdiction of a tribunal so constituted is exercised outside of the territorial limits of the United States is sufficient ground for omitting the forms of indictment and trial by jury which are indispensable in criminal causes within such territorial limits; whether the appellate resources provided are consistent with the federal judicial system of which the consular judicial system must necessarily be a part; whether the discretional power conferred by section 4193 of the Revised Statutes upon the minister,

to submit or not, as he may see fit, a death sentence which he himself may have pronounced, to the Presidential clemency, is in harmony with the Executive prerogative of pardon; whether the powers given to ministers or consuls, as such, to make decrees and regulations for the conduct of trials in their courts, before themselves as judges, may not involve a legislative function incompatible with the judicial function; and lastly, whether the broad authority given by section 4088 of the Revised Statutes to consuls and commercial agents in countries not inhabited by any civilized people, or where no treaty stipulations exist, is constitutional or safe.

Apart from the constitutional aspects of the question, it is, in the second place, open to serious doubt whether the class of officers of which the statute makes judges is fitted for the discharge of the great responsibility imposed. The consular service is a branch of the public function requiring a peculiar fitness. Its province is essentially commercial. Its relations with the home government concern our foreign commerce and our domestic revenues. Our often repeated boast that the consular service of the United States is self-sustaining is justly maintained by the selection of officers of business abilities, men who can aid in molding the channels of trade and in building up American interests where they have languished, or creating them where they have not before existed. In no part of the world is this general business tact more necessary to the development of a healthy consular policy than in the far East; and it is precisely in those countries that, under our present system, onerous judicial functions, demanding an entirely distinct range of abilities, are imposed on our consular officers. A man holding such a post may be an excellent mercantile representative, or else an able judge; rarely both. If appointments to Eastern consulates be made with primary regard to commercial knowledge and business tact, there is risk, through unfamiliarity with the law, of incongruous and conflicting procedure in the different consular courts, of misinterpretations of law, of assertions of prerogative involving international disputes. If, on the other hand, a professional judicial training be made the criterion of such nominations, the consular function becomes in most cases injuriously subordinated.

A third consideration flows from the two preceding. Section 4086 provides for the extension of criminal and civil jurisdiction over American citizens and all others in foreign countries within treaty stipulations, "in conformity with the laws of the United States, which are hereby extended *so far as is necessary* to execute such treaties, respectively, and *so far as they are suitable* to carry the same into effect." And thereupon this section goes on to make the following extraordinary and sweeping provision:

> But in all cases where such laws are not adapted to the object, or are deficient in the provisions necessary to furnish suitable remedies, the common law and the law of equity and admiralty shall be extended in like manner over such citizens and others in those countries; *and if neither the common law, nor the law of equity or admiralty, nor the statutes of the United States furnish appropriate and sufficient remedies*, the ministers in those countries, respectively, *shall, by decrees and regulations* WHICH SHALL HAVE THE FORCE OF LAW, *supply such defects and deficiencies.*

It seems only necessary to read this section to perceive the strange and incompatible blending of executive, judicial, and legislative functions contemplated in a single officer, and one not even necessarily a minister, for section 4088 gives these extensive powers to consuls and commercial agents in uncivilized or non-treaty countries. The suitableness of our laws, or of any recognized laws of civilization, the extent

to which they may be adaptable, and their replacement by decrees and regulations having the force of law, are all left to the judgment of one man, who is himself, also, under the statutes, an original as well as an appellate tribunal. I venture to question very seriously the constitutionality of a provision which delegates the law-making function to an officer never foreseen by the Constitution as a law-giver. And I most emphatically doubt the wisdom of intrusting the interpretation and application of the vast body of common and statute law, of equity and admiralty jurisprudence, of giving powers, in short, greater than ever the Roman law conferred on the pro-consuls of the empire, to an officer who, under the terms of the commitment of this astounding trust, is practically irresponsible. For, strange though it may appear, as the Revised Statutes read, no resource of revision or appeal from the minister's legislative action is apparent.

In the original act of August 11, 1848 (which is followed by that of June 22, 1860), these legislative clauses I have quoted appear in section 4, and may, possibly, by a stretch of the context, be comprised with the prescriptions of sections 5 and 6, concerning forms, procedure, oaths, bail-bonds, fees, &c., the regulations, decrees, and orders concerning which are to be drawn up after consultation with the consuls within the minister's jurisdiction, and submitted to the Secretary of State to be laid before Congress for revision. In the Revised Statutes, however, these latter clauses are found separately, in sections 4117, 4118, and 4119, while the comprehensive authorization of section 4086 stands alone, without suggestion of any ministerial responsibility whatever in connection therewith.

This brings me naturally to a fourth consideration in regard to the codification of the enactments themselves pertaining to consular jurisdiction. Sections 4083 to 4130 of the Revised Statutes are a rearrangement and continuous compilation of the laws on the subject since 1860. The result is, unfortunately, to render the statute ill-digested, disconnected in its parts, and obscure as a whole. Intended for the guidance of officers not as a rule versed in jurisprudence, it would seem that the utmost clearness and precision would have been sought, with distinct definitions of their powers and duties. In practice, however, an examination of the questions of interpretation referred to the Department of State by our diplomatic and consular officers shows a latitude of construction and a diversity of conclusions not entirely unwarranted by the text of the law. All, however, agree in the complete liberty of the officer conducting a criminal or civil proceeding to decide within his own discretion touching the assistance of assessors, the admissibility of testimony, the rehearing of the parties, the granting of new trials, the exercise of the right of appeal, and, in a word, nearly every matter pertaining to his own administration of the law.

A fifth grave consideration rests on the conflicts of jurisdiction which frequently arise between consuls of the United States, acting as judges, and the judicial officers of other nations. This is especially the case in dealing with offenses committed either on board American ships lying in port, or by American seamen on shore. The case of John Ross, at Yokohama, to which you have referred in your recent message to Congress, is one in point. The ground taken by the consular court at Yokohama was, in this instance, strictly in accord with the principles of American law and jurisprudence, and has been fully supported by this government. The facts disclosed that Ross, being as is alleged a British subject, shipped as a seaman on board an American merchant vessel; and that while on board that vessel, then lying in the port of Yokohama, he murdered the second-mate, for which offense he was tried by the

consul-general, convicted, and on the 20th of May, 1880, sentenced to death. His sentence was commuted by the President, and he was removed to this country to undergo life imprisonment at Albany, N. Y. The British court at Yokohama claimed jurisdiction by reason of Ross's alleged British citizenship. The position taken by this government and adhered to was that the United States, in virtue of its legislation in extending the laws thereof over its citizens in foreign countries, "and *over all others*, to the extent that the terms of the treaties, respectively, justify or require" (section 4086, Revised Statutes), and under the articles of the treaty with Japan, must consider a foreign seaman duly enrolled on an American merchant vessel as subject to the laws and entitled to the protection of United States to precisely the same extent that a native-born seaman would be during the period of his service.

Still another consideration remains, to some extent related to the foregoing, but distinct enough as a whole to require a separate place, and that is the confusing character of our statutes in erecting a system of jurisdiction of various applicability in different countries. Thus, in China and Japan, the consular courts are practically Federal district courts, with limited appeal to the circuit court of California. In the others there is no appeal. The procedure, too, is diverse in Siam from that enforced in Turkey, and again different in Egypt. A precedent in one country is not followed in another. In some, the general principle of trial in a court of the defendant's nationality is strictly followed; in others, a mixed tribunal is resorted to when the complainant is a native. These discrepancies, arising in the first place from the varying language of treaties, are increased by the endeavor to make the language of the statutes broad enough to cover all cases.

It would be easy to adduce instances to support each and all of these considerations, and to show that our judicial system in the East is vague in precept, incongruous in application, and imperfect in results. I think, however, that enough has been herein set forth to warrant Congress in earnestly considering the possibility and the necessity of devising a more perfect and harmonious system. To this end, I respectfully submit a few suggestions as to the direction in which a reform may be sought.

The most complete and advanced procedure would undoubtedly be, the constitution of mixed international tribunals, wherein judges appointed from the various treaty powers would sit *in banc*, with native judges, to try causes in which a foreigner might be concerned as plaintiff or defendant.

Such a tribunal, having cognizance in civil causes only, has been in successful operation in Egypt for five years past, and the United States is represented therein by capable judges. A mixed court of this kind is not properly an extraterritorial concession. It is rather a mutual recourse to judicial arbitration, and its power flows essentially from the legislation of the country where it is held. Existing treaties, however, as with China and Japan, are purely extraterritorial in their stipulations, and do not contain provisions for mixed courts. If, to a certain extent, the principle of mixed jurisdiction is recognized in the trial of natives at some of the Chinese ports, where the consul sits in concert with a native judge, it is a concession on the part of native jurisdiction, not a right claimed and exercised on behalf of our own; and I may add that this government has consented to reciprocity in this respect. I find that my predecessor, Mr. Secretary Seward, under date of February 18, 1869, instructed the United States minister at Peking to inform the Chinese minister of foreign affairs that, in cases where a Chinese subject may be plaintiff, "we have no objection to the presence of an officer

of that government as an assessor, but the decision must be made by the consul."*

The establishment of a mixed international court in any country would, therefore, require appropriate modification of existing treaties and relinquishment of absolute extraterritoriality, as a starting point; and this, in turn, would demand the existence in such country of an organized judicial system approaching in methods and results to the systems of European and American jurisprudence, as was the case in Egypt. In China, however, as in nearly all the countries of the East where extraterritoriality of jurisdiction obtains, there is no adequate system of native jurisprudence to serve as a basis for a mixed tribunal, and little or no indication that the native governments appreciate the insufficiency of their codes, or are disposed to move for a reform therein.

I may remark, nevertheless, that in Japan the case is different. The rapid assimilation of the native methods of that empire to Western standards makes the creation of an international court there a probability in the near future; and, indeed, I understand that the government of the Emperor contemplates a proposal to the treaty powers in this sense.

Dismissing, then, as impracticable, the adoption of mixed tribunals as a general measure in the East, a reform, on the part of the United States, is naturally to be sought in the erection of tribunals, purely judicial in character, and conforming in principle and practice to the standards of jurisprudence in the United States.

Taking China as a starting point for a reform, a high court of the United States could be constituted at the capital, or, better, at Shanghai, as the principal center of foreign intercourse. An American judge could be established there, appointed by the President, with functions analogous to those of a judge in the Federal district courts of the United States, and holding office for life or during good behavior. Among the American residents there ample material could be found for grand juries to present indictments, and for ordinary juries to try causes triable here by jury. A clerk could also be appointed, giving the court full competence as a court of record. Court-houses, marshals, and prisons are already provided by statute, so that comparatively little of the full judicial machinery of action remains to be devised. In the larger commercial cities an associate justice could be stationed, with powers and functions precisely defined by law. A simple and intelligent code could be framed, certain in its application. At stated intervals a full term could be held at the seat of the principal court; and the assimilation of such a judicial system to our Federal system could be completed by the provision of appellate recourse to the circuit court of the United States in California.

In Japan, in Siam, in Madagascar, in all the countries, in short, where extraterritoriality obtains, similar provision could be made with such modification and adjustment as the altered conditions there might require, but always with conservation of the principles of separate judicial functions, of constitutional guarantees, of trial, and of appeal to the Federal courts of higher grade.

The adoption of such a wise and consistent course would do away with the uncertainties which surround our present Eastern system; would secure harmonious concert in all parts of our judicial scheme, and would assure to all American citizens accused of crime, or under civil process, every guarantee of personal rights which the Constitution gives to them at home.

I regard a reform in this sense as especially indispensable in capital cases. As at present organized, doubts must arise in the mind of every

* See also Article IV of the recent treaty with China of Nov. 17, 1880.

constitutional jurist touching the power of a consular court, or rather of a minister or consul acting judicially under the authority of Congress, to legally and constitutionally deprive a fellow-being of life. Since the existing statute was framed in 1848 and modified and extended in 1860, at least seven capital convictions have occurred thereunder, all in China and Japan. These instances are worthy of note, especially as in one of them actual execution of the sentence followed.

First. David Williams, claiming to be a British subject, was, in November, 1863, at Shanghai, convicted by Consul-General Seward, acting judicially with assessors, of "piracy and murder," in the robbery of a Chinese craft on the Yangtse. The sentence was approved by the secretary of legation, acting as minister, and a death-warrant signed by him. A few hours before the time fixed for execution Williams committed suicide in the consular jail.

Second. James White was in like manner convicted of murder by the consular court at Shanghi, November 23, 1863. Mr. Burlingame, the minister, issued a warrant for the execution, but before the sentence could be carried out White escape from jail and was not recaptured.

Third. John D. Buckley, claiming to be a British subject, was in like manner convicted of murder by the consular court at Shanghai, on the 1st of February, 1864. His cause was ably defended by his counsel, Mr. J. B. Eames, who argued the unconstitutionally of a trial without indictment or jury. In Mr. Eames's subsequent plea in error for an arrest of judgment, the following remarkable passage occurs:

> The exterritoriality of the proceedings cannot affect the question. Congress has no power not delegated to it by the Constitution; and the territorial limits of the power cannot exceed those of the instrument from which it is derived.

His exceptions were not admitted. The minister, Mr. Burlingame, approved the sentence of the consular court and issued a warrant of execution. Writing to the Department of State, Mr. Burlingame said, June 3, 1864, "A vigorous effort was made by Mr. Eames, the counsel of the prisoner, to secure a reference to the President, *but I could not see my way clear to grant his request;*" thus giving the prosecution, and not the prisoner, the benefit of the doubt. Buckley was hanged, at the United States consulate, on April 1, 1864. In reporting the execution of the sentence Mr. Consul-General Seward wrote to Mr. Burlingame as follows:

> I have only to say, in conclusion, that I trust no similar duty will be imposed upon me again so long as I remain in office. There is no reason, *excepting the absence of appropriate legislation*, why American citizens in China, charged with grave offenses, should not have the privilege of a trial by jury as elsewhere throughout the world where the institution of civilization prevails. When such is the case, I think it not right to deprive those thus charged of a privilege so dear to all freemen, nor yet to impose upon a consular officer the responsibilities so grave as they are now obliged to assume.

The proceedings and correspondence in this case, and in the two preceding, are printed in the Diplomatic Correspondence for 1864, vol. iii, pp. 392–419, and I commend them to attentive perusal. The action taken seems to fall in every particular within the statute of June 22, 1860, even to the denial of reference to the President, for section 15 of that act makes it the minister's *duty* to order execution of the sentence of the consular court in capital cases, and merely authorizes him specifically, if mitigating circumstances be found, "to submit the case to the President *for pardon*."

Fourth. James Webb, an American seaman, was, in December, 1878, by the consular court at Nagasaki, Japan, convicted of murder. The chargé d'affaires at Yeddo submitted the proceedings to the Department of State for review, although not required or authorized by the statutes so to do. My predecessor, Mr. Secretary Evarts, found himself

confronted by the question of the constitutionality of a death sentence without indictment and trial by jury, and the President was counseled by him and by the Attorney-General to exert his prerogative of clemency. Webb's sentence was accordingly commuted to that of imprisonment for life.

Fifth. Before the consular court at Osaka and Hiogo, Japan, on the 9th of April, 1880, William Dinkelle, an American citizen and seaman, was convicted of murder on shipboard in the port of Hiogo. The minister, Mr. Bingham, withheld the issuance of a death-warrant, and referred the case, with recommendation of clemency, to the President, who remitted Dinkelle's sentence on condition of undergoing imprisonment for life. Dinkelle refused to accept this conditional pardon, and is still in jail under indefinite postponement of the execution of the sentence of the consular court.

In this incident may be found another illustration of the abnormal working of our extraterritorial laws.

Sixth. The case of John Ross, convicted of murder in the consular court at Yokohama, has already been narrated above.

Seventh. At Alexandria, Egypt, in June, 1880, Stephen Mirzan, a naturalized American citizen, was convicted of murder by the United States minister at Constantinople, who, under the instructions of the Department of State, proceeded to Alexandria and assumed original jurisdiction in the case. On reference of the proceedings hither, remission of the death penalty, on condition of imprisonment for life in the United States jail at Smyrna, was granted by the President, and Mirzan is now undergoing his sentence.

I have confined my examination of cases in practice to those of a capital nature, as of the highest importance. Since the statute of 1848 was passed, an immense amount of consular judicial work, in civil and criminal causes, has accumulated, of which a detailed examination would not be profitable to my present purpose. If, on the whole, the administration of consular justice abroad, in favor of American citizens, has worked with considerable regularity, utility, and success, this result has been due rather to the right of extraterritoriality itself, and to the average common sense of the business officers to whom the exercise of that right has been so broadly committed, than to the constitutionality or precision of the statutes. And it may be doubted whether the naked fact that an arbitrary and practically unlimited delegation of judical powers has been followed in the main by a discreet use thereof, is a sufficient argument for the conferment of those powers, or their unmodified continuance for all time.

I earnestly desire, Mr. President, in the discharge of my duty to invite your attention, and through you the attention of Congress, to such action on this important subject as will replace our present legislation by a well-considered frame work of extraterritorial jurisprudence, which will dispel all the incongruities which now hamper our systems in the East, and which will remove all doubts as to their constitutionality. I cannot do better, in conclusion, than say, in the words of the late Senator Carpenter, of Wisconsin, uttered in the Senate on the 8th of January last: "The question is whether this government can derive any power denied to it by the Constitution from a treaty with a foreign nation?"

Respectfully submitted.

JAMES G. BLAINE.

DEPARTMENT OF STATE,
Washington, December 19, 1881.

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47TH CONGRESS, 1st Session. } SENATE. { EX. DOC. No. 22.

MESSAGE

FROM THE

PRESIDENT OF THE UNITED STATES,

TRANSMITTING

A report from the Secretary of State, in response to Senate resolution of May 19, 1881, giving a list of the names of all officers, clerks, and other employés of that department not required to be confirmed by the Senate.

DECEMBER 19, 1881.—Read, and referred to the Committee on Appropriations and ordered to be printed.

To the Senate of the United States:

I transmit herewith, in reply to the resolution of the Senate of the 19th of May last, a report from the Secretary of State, with an accompanying paper.

CHESTER A. ARTHUR.

WASHINGTON, *December* 19, 1881.

DEPARTMENT OF STATE,
Washington, December 16, 1881.

The Secretary of State, in answer to the following resolution of the Senate, of the 19th of May last—

Resolved, That the Secretaries of State, Treasury, Interior, War, Navy, the Post-master-General, and the Attorney-General be directed to transmit to the Senate the names of all officers, clerks, and other employés borne upon their rolls, respectively, not required to be confirmed by the Senate, and the salary paid to each, together with the date of their appointment, the State to which each is charged, the grade of office held, the compensation received, and whether each of said officers, clerks, or employés is white or colored, and which of such clerks or employés served in the regular or volunteer service of the United States during the war of the rebellion—

has the honor to transmit herewith, for the information of that body, a tabulated statement containing the information called for by the resolution, so far as it relates to the Department of State.

Respectfully submitted.

JAMES G. BLAINE.

The PRESIDENT.

List of officers, clerks, and other employés in the Department of State.

Name.	Whence appointed.	Date of appointment.	Grade of office.	White or colored.	In the service of the United States during the war of the rebellion.	Compensation.
Sevellon A. Brown	New York	Dec. 9, 1864	Chief clerk	White		$2,500
Alvey A. Adee	District of Columbia	July 9, 1877	Chief of Diplomatic Bureau	do		2,100
Francis O. St. Clair	Maryland	Nov. 12, 1865	Chief of Consular Bureau	do	Volunteer	2,100
John H. Haswell	New York	Jan. 1, 1865	Chief of Bureau of Indexes and Archives	do		2,100
Robert C. Morgan	do	Aug. 15, 1874	Chief of Bureau of Accounts	do	Volunteer	2,100
Michael Scanlan	do	July 1, 1874	Chief of Bureau of Statistics	do		2,100
Henry L. Thomas	do	Sept. 1, 1869	Translator	do		2,100
George Bartle	Virginia	Dec. 1, 1852	Clerk of class four	do		1,800
Edward Haywood	New York	Nov. 1, 1861	do	do		1,800
Alexander H. Clements	District of Columbia	Mar. 28, 1866	do	do	Volunteer	1,800
Newton Benedict	New York	Sept. 15, 1865	do	do		1,800
John J. Chew	District of Columbia	May 24, 1870	do	do		1,800
Theodore F. Dwight	California	Apr. 3, 1875	do	do		1,800
Henry A Blood	New Hampshire	Aug. 7, 1877	do	do		1,800
Charles S. Hill	New York	Dec. 4, 1878	do	do		1,800
Francis J. Kieckhoefer	District of Columbia	Aug. 1, 1874	do	do		1,800
Thomas H. Sherman	Maine	July 1, 1881	do	do		1,800
Thomas Morrison	New York	Mar. 7, 1867	Clerk of class three	do	Volunteer	1,600
Prosper L. Schücking	District of Columbia	Aug. 17, 1868	do	do		1,600
Henry P. Randolph	Virginia	Mar. 1, 1874	do	do		1,600
George L. Scarborough	Connecticut	June 19, 1877	do	do		1,600
James R. O'Bryon	District of Columbia	Oct. 15, 1870	Clerk of class two	do		1,400
William A. Van Duzer	New York	July 24, 1875	do	do	Volunteer	1,400
James Taggart	do	Dec. 15, 1880	do	do		1,400
T. John Newton	District of Columbia	July 1, 1874	Clerk of class one	do		1,200
Mary Markoe	Maryland	July 1, 1874	do	do		1,200
William Russell	District of Columbia	Jan. 25, 1879	do	do		1,200
Charles I. Rider	do	Dec. 8, 1875	do	do		1,200
Thomas W. Cridler	West Virginia	Oct. 1, 1875	do	do		1,200
John B. Hawes	California	May 1, 1879	do	do		1,200
James B. Philp	New York	July 1, 1880	do	do		1,200
Andrew H. Allen	North Carolina	Sept. 15, 1880	do	do		1,200
John A. Hervey	West Virginia	July 1, 1881	do	do		1,200
Alfred Williams	Ohio	Oct. 1, 1878	do	do		1,200
James Hall Colegate	District of Columbia	May 1, 1873	Clerk, $1,000 salary	do		1,000
E. Throop Martin	New York	May 20, 1881	do	do	Regular	1,000
St. Leger A. Touhay	District of Columbia	June 15, 1881	do	do		1,000
Robert S. Chilton, jr	do	Nov. 1, 1878	do	do		1,000
Thomas Griffin	do	July 1, 1874	Clerk, $900 salary	do		900
Nellie M. Joselyn	Indiana	July 1, 1874	do	do		900
Sue Hamilton Owen	Georgia	July 1, 1874	do	do		900
Louisa A. Pratt	Massachusetts	April 1, 1878	do	do		900

Charles McCarthy	District of Columbia	May 1, 1871	do	do		900
Stanislaus M. Hamilton	do	July 1, 1880	do	do		900
Frank M. Lee	Maryland	Nov. 1, 1880	do	do		900
Ella T. Canfield	Illinois	Mar. 1, 1881	do	do		900
Stella Yale	New York	June 15, 1881	do	do		900
Lewis Wolfley	Louisiana	July 1, 1881	Temporary clerks	do	Volunteer	1,200
William A. Brown	Indiana	Aug. 1, 1881	do	do	do	1,200
Sydney Y. Smith	District of Columbia	July 1, 1881	do	do		900
Emma M. Sheridan	Louisiana	July 1, 1881	do	do		900
Edmund J. Moffat	New York	July 1, 1881	do	do		900
Jay Ewing	Ohio	July 1, 1881	do	do		900
William P. Faherty	District of Columbia	Feb. 1, 1840	Proof-reader	do		1,300
A. G. Gedney	do	May —, 1881	Lithographer	do		$3 per day.
James A. Barr	do	July 1, 1873	Assistant lithographer	do		$1 per day.
George C. Castell	do	Feby. 1, 1881	Chief engineer	do	Volunteer	1,200
Louis Beauregard	do	———, 1869	Assistant engineer	do		1,000
Thomas Toner	do	Sept. 21, 1875	Conductor of elevator	do	Volunteer	720
Jeremiah J. Brosnan	do	Sept. 21, 1875	Fireman	do		720
John Butler	Maryland	Sept. —, 1871	do	Colored	Volunteer	720
Joseph Smallwood	District of Columbia	Sept. 21, 1875	do	do	do	720
John McCarthy	Virginia	July 1, 1877	do	do		720
Patrick Farquher	District of Columbia	July 21, 1877	do	do		720
Nicholas Caffrey	New York	———, 1869	do	do	Regular	720
William Gwin	Virginia	July 1, 1871	Messenger	do	do	840
William B. Browne	District of Columbia	———, 1878	Assistant messenger	do		720
Francis P. Burke	do	July 19, 1875	Superintendent of watch	do		1,000
Albert B. Scrivener	do	———, 1878	Assistant superintendent of watch	do	Volunteer	800
John Donnelly	Pennsylvania	July 1, 1875	Watchman	do	do	720
Robert Wilson	New York	July 1, 1875	do	do		720
John A. Graves	District of Columbia	———, 1879	do	do		720
James H. Sprigman	Pennsylvania	———, 1878	do	do	Volunteer	720
Charles W. Drury	District of Columbia	Feb. 5, 1881	do	do		720
George Wolforth	do	———, 1866	do	do		720
Henry W. Freeman	do	Aug. 10, 1866	Laborer	do	Volunteer	660
Charles E. Kearney	do	June —, 1879	do	do		660
Henry Jarvis	do	———, 1866	do	do		660
Edward A. Savoy	do	———, 1871	do	do		660
John T. Johnson	do	July 1, 1875	do	do		660
John Barry	do	———, 1879	do	do		660
John H. Burrill	Virginia	———, 1878	do	do		660
Russell Boyd	District of Columbia	———, 1879	do	do	Volunteer	660
Frank M. Moore	do	———, 1880	do	do		660
James Quinn	do	———, 1880	do	do		660
Richard H. Hawkins	do	Mar. 1, 1881	do	do		660
Richard Gillem	Maryland	———, 1877	do	do		660

47TH CONGRESS, 1st Session. } SENATE. { EX. DOC. No. 23.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING

A communication from the Chief of Engineers, dated the 14th instant, covering copy of report from Maj. J. A. Smith, Corps of Engineers, upon a survey for a harbor of refuge at New Buffalo, Mich.

DECEMBER 19, 1881.—Referred to the Committee on Commerce and ordered to be printed.

WAR DEPARTMENT,
Washington City, December 16, 1881.

The Secretary of War has the honor to transmit to the United States Senate, for the information of the Committee on Commerce, a communication from the Chief of Engineers dated the 14th instant, covering copy of report from Maj. J. A. Smith, Corps of Engineers, upon a survey for a harbor of refuge at New Buffalo, Mich., made in compliance with the requirements of the river and harbor act of March 3, 1881.

ROBERT T. LINCOLN,
Secretary of War.

The PRESIDENT *pro tempore*
of the United States Senate.

OFFICE OF THE CHIEF OF ENGINEERS,
UNITED STATES ARMY,
Washington, D. C., December 14, 1881.

SIR: To comply with requirements of the river and harbor act of March 3, 1881, I have the honor to submit herewith a copy of a report to this office from Maj. J. A. Smith, Corps of Engineers, of results of a survey, made under his direction, for a harbor of refuge at New Buffalo, Mich.

Very respectfully, your obedient servant,

H. G. WRIGHT,
Chief of Engineers, Brig. and Bvt. Maj. Gen.

Hon. ROBERT T. LINCOLN,
Secretary of War.

SURVEY FOR HARBOR OF REFUGE AT NEW BUFFALO, MICH.

UNITED STATES ENGINEER OFFICE,
Indianapolis, Ind., October 10, 1881.

GENERAL: I have to submit the following report of a survey for a harbor of refuge at New Buffalo, Mich., and an estimate of the cost, as required by section 3 of the river and harbor act, approved March 3, 1881.

* * * * * * *

On the 3d of June, I instructed Assistant Engineer O. L. Petitdidier to proceed to New Buffalo, and make a careful survey of a portion of the lake adjacent to the town, and also of a part of the interior swamp and creek known as Lake Pottawatomie. * * * The field work has been carefully reduced, * * * and the map is forwarded in a separate package to accompany this report.

New Buffalo is situated near the south end of Lake Michigan, and about 10 miles east of Michigan City, Ind.

In 1867 the sum of $60,000 was appropriated for the improvement of the harbor. The following appropriations were subsequently made for the same purpose; in 1870, $5,000, and in 1871, $500.

The subject of the improvement of this harbor was referred to a Board of Engineers in 1868, whose report was adverse thereto; but the appropriation act having directed the execution of the work, there was no other course to pursue than to commence the project with the means appropriated, and submit the result of the experiment, in order that Congress might determine whether the improvement should be continued.

The Board of Engineers estimated the cost of improvement at $500,000.

Of the amounts appropriated, $65,000 were expended in constructing piers and dredging a channel. The improvements made were never sufficient to attract or accommodate any commerce, and at present there are no commercial statistics to report.

The place is in the collection district of Chicago, and the nearest light-house is at Michigan City, Ind.

During the few years in which I have been charged with these works several vessels have been wrecked at and near Michigan City, principally because the incomplete condition of the outer harbor there made the entrance difficult; but I have not known, and cannot learn of any vessels having been driven ashore at any point nearer New Buffalo than the one named.

Undoubtedly a good harbor of refuge would attract a considerable commerce, and in addition would build up many local interests, but to what extent is a matter for conjecture only.

There are no engineering difficulties in the way of building a harbor suitable for a refuge, but it will involve considerable expense.

A harbor of refuge, to fulfill its object, must cover a sufficient area and depth to enable vessels to enter, "round to" or "wear" into the wind, and ride safely at anchor.

In addition to this, it is very desirable that the protection be so arranged that vessels may safely enter and leave the harbor without incurring the expense of towing.

The direction of the shore line at New Buffalo is approximately northeast and southwest, while the winds which would make a shelter necessary are from northerly directions. The drift caused by these winds is not large, though the bottom is composed of a sand which is easily moved. No observations have been made as to the direction of the drift, but a study of the map indicates that it is from northeast to southwest.

The sand is in places very coarse, like gravel, and overlies a stratum

of very hard clay; this clay is found at a depth of 24 feet near the shore, and 32 to 37 feet at a distance of nearly one-half a mile into the lake. The stratum of sand becomes less in thickness as it extends into the lake, and at a distance of one-half a mile it varies from 3 to 11 feet in depth, so far as ascertained from the soundings taken.

This affords a good support for a breakwater and piers upon foundations of piles driven through the sand into the clay. The superstructure of such works cannot be made permanent if constructed after the method heretofore employed in our harbor improvements, because the best of timber will decay sooner or later, and unless carefully watched and repaired will not only be itself a loss, but, by uncovering the portions below, will permit them to be emptied of stone, and destroyed.

The method I am now employing at Michigan City not only prevents any settling of the cribs but holds them so firmly in position that they are not moved in heavy gales occurring before the superstructure is added. This permits the engineer to build the superstructure at once, thus saving the expense of the temporary wooden work with other numerous and expensive contingencies.

My estimate for a breakwater is therefore made for the first cost of a work with the usual superstructure of timber and loose stone, with a second estimate for the same if built with a superstructure or parapet of concrete masonry faced with stone. This method, though more expensive at first, will be a great ultimate economy.

Upon the map I have indicated in broken lines, the positions and lengths of a breakwater and piers to enclose a harbor for refuge entirely outside the line of the shore.

At a point about 2,400 feet from the shore and in the prolongation of the present east pier in water 30 feet deep, a line of breakwater is commenced and extended directly eastward a distance of 1,500 feet.

It is proposed to extend a second breakwater 1,500 feet in a southwesterly direction, making an angle of 120° with the first, and leaving an opening of 400 feet at the angle.

As heavy winds will cause seas and currents to pass along the faces of the breakwater, two entrance piers are planned, one of 300 feet, the other of 200 feet in length; the longer pier on the northeast side.

As a further protection to the harbor, and to prevent its becoming filled with drift, piers are planned extending from the shore to points 200 feet inside the extremities of the two wings of the breakwater.

The plan above proposed will fulfill all the requirements of a harbor of refuge of as small dimensions as I consider prudent for any practical use. Were there at present any commerce to accommodate, it should be made larger rather than smaller.

I estimate the expense of this work as follows:

1st. If built with superstructure of crib-work—

3,500 linear feet of breakwater and entrance piers, 35 feet wide, at $175 per foot	$612,500
Piers from shore, 12 to 20 feet wide, 3,000 linear feet, at $50	150,000
Contingencies, nearly 5 per cent	37,500
Total	800,000

2d. If covered with superstructure and parapet of masonry, the main body of work below water being as before—

3,500 feet, foundations and crib-work, at $125	$437,500
Superstructure and parapet for same, at $75 per linear foot	262,500
Foundation and crib-work for 3,000 linear feet of shore-piers, at $40 per linear foot	120,000
Superstructure and parapet for same, at $35 per linear foot	105,000
Contingencies, nearly 5 per cent	45,000
Total	970,000

Although I consider the foregoing plan decidedly the better one for a harbor of refuge, I submit a second, which consists of deepening a portion of the swamp and creek, and connecting the harbor thus made with the lake by a channel 300 feet wide, protected by piers.

The plan here indicated is as follows:

Two parallel entrance piers, 300 feet apart, to extend into water 24 feet deep; the northeast pier to be in the prolongation of the old pier.

The inner basin to be made with a wharf front parallel to and 600 feet from the outer line of Mechanic street. The eastern part of the basin to be 800 feet wide, and its extent to be determined by the railroad which now crosses the swamp; the western portion to be about equal in area, the outer line being parallel to the adjacent shore of the lake. The positions of the piers and outlines of the inner basin are indicated on the map in broken lines. The outer and inner lines of the basin are prolonged to indicate that the size of the basin may be almost indefinitely extended beyond what is called for in this project, should the demands of commerce at any future time make it desirable.

As a commercial venture the basin thus outlined would be superior, and would cost less for maintenance than the outer harbor; but as a refuge simply, it cannot be urgently recommended.

I estimate the cost of this work as follows:

4,400 linear feet of piers, composed of pile foundations supporting crib-work filled with stone, at $75	$330,000
Dredging channel 300 feet wide, to a depth of 16 feet, 155,000 cubic yards of material, at 25 cents	38,750
For construction of basin 2,500 feet long, 600 to 800 feet wide, and 16 feet deep, as outlined on map, dredging and removing 900,000 cubic yards of material, at 25 cents	225,000
Contingencies of price, &c	56,250
Total	650,000

Very respectfully, your obedient servant,

JARED A. SMITH,
Major of Engineers.

Brig. Gen. H. G. WRIGHT,
Chief of Engineers, U. S. A.

REPORT OF MR. O. L. PETITDIDIER, ASSISTANT ENGINEER.

INDIANAPOLIS, *July* 21, 1881.

SIR: I have the honor to report that in accordance with your instructions * * * I reached New Buffalo on June 6.

With the exception of a few unimportant details which were taken from a former map in the office, the data given are entirely from my note books.

* * * * * * *

The height of water surface at time of sounding was referred to a bench-mark (shown on the map at south end of east pier), the bench-mark being 6.72 feet above water surface.

The only change noticeable since the latest map was made was that the Chicago and Michigan Lake Shore Railroad have made an embankment of sand over their bridging, or rather trestling, across Pottawatomie Lake; they have of course left an opening for Galien River; the other changes border more on a general state of dilapidation, owing to a want of attention to repairs which have been necessary from time to time, but have never been made.

The inner piers, being washed by the water of the creek, have decayed much more rapidly than the east pier outside the harbor.

The west pier and the smaller east pier inside are now beyond repairs.

The outside east pier is, in some of its parts, in a fair state of preservation, while others will rapidly go to ruin unless soon restored.

The borings were made with a water-jet from a force-pump having a rubber hose

attached with different lengths of 1½-inch gas-pipe, which were connected as the pipe descended.

In ordinary sand the pipe sank very rapidly. I can give no exact figures, but it was as fast as a man could conveniently lower it.

To ascertain the nature of the bottom an auger mounted on a ¾-inch gas-pipe was used, and the finding and bringing up samples of the material was along and on the outside of the pipe, it being found that the sand washed out from the bottom left a large conical hole through which the bottom was easily reached. The whole apparatus was on a raft put together in one hour.

I contented myself with going to the clay, whenever possible, so that I do not know its thickness.

In the inner harbor clay was struck but once. All the rest of the borings passed through a stratum locally called "muck," which is very viscous in its nature without being as cohesive as the clay.

A depth of 28 feet was bored through the muck, but it was very difficult to withdraw the pipes, as the holes washed out by the jet of water were only large enough for the pipes to pass through. I therefore desisted trying to reach the clay.

I have been informed that the Michigan Central Railroad Company, in driving piling to carry their track to the lake, when near the boring marked No. 3 on the map, drove three piles, end to end, until a depth of 90 feet was reached, without any solid bottom.

The citizens have appointed a committee on harbor improvement, and raised about $7,000 to continue to construct an outside west pier; they have appointed an engineer, and seem to be pushing matters vigorously.

When I left New Buffalo, at the close of the survey, they had already on the ground some 200 piles 35 feet long, and were waiting before commencing work for advice as to the best method of construction.

The survey was completed June 25. * * * The elevation of numerous points above the water has been determined, and is indicated on the map, preceded by the sign (—).

Number of soundings taken and located is 1,667.

Number of borings, 18.

Boring No. 1.—Water, 7 feet; muck, 5 feet; depth to clay, 12 feet.

Boring No. 2.—Water, 8.5 feet; gravel, 1.5 feet; through muck, 13 feet; total depth, without reaching clay, 23 feet.

Boring No. 3.—Water, 8 feet; muck, 8 feet; total depth reached, 16 feet; no hard bottom reached.

Boring No. 4.—Water, 8 feet; muck, 9 feet; no hard bottom at 17 feet.

Boring No. 5.—Water, 10 feet; muck, 10 feet; no hard bottom at 20 feet.

Boring No. 6.—Water, 5 feet; sand and gravel, 7 feet; muck, 4 feet; no hard bottom at 16 feet.

Boring No. 7.—Water, 8 feet; sand and gravel, 16 feet; no muck; clay was struck at 24 feet.

Boring No. 8.—Water, 18 feet; sand and gravel, 5.5 feet; clay was struck at 23.5 feet.

Boring No. 9.—Water, 18.5 feet; sand and gravel, 6 feet; clay at 24.5 feet.

Boring No. 10.—Water, 25 feet; sand and gravel, 3 feet to hard pan; could not penetrate through it.

Boring No. 11.—Water, 25 feet; sand and gravel, 6.5 feet; struck clay at 31.5 feet.

Boring No. 12.—Water, 26 feet; sand and gravel, 11 feet; struck clay at 37 feet.

Boring No. 13.—Water, 17 feet; sand and gravel, 13 feet; hard pan, 1.5 feet; clay reached at 31 feet.

Boring No. 14.—Water, 19 feet; sand and gravel, 3 feet; hard pan, 1 foot; clay struck at 23 feet.

Boring No. 15.—Water, 8 feet; sand and gravel, 13 feet; a dark muck clay, quite hard, was found at 21 feet.

Boring No. 16.—Water, 2.5 feet; sand and gravel, 7.5 feet; struck muck at 10 feet, and could not penetrate any farther.

Boring No. 17.—Water, 6 feet; sand and gravel, 5.5 feet; conglomerate and hard gravel, 1 foot; sand and gravel, 11 feet, to some hard bottom which could not be penetrated; total depth reached, 17.5 feet.

Boring No. 18.—Water, 4 feet; sand, 6 feet; muck, 21 feet; no hard bottom at 27 feet.

I remain, very respectfully, your most obedient servant,

O. L. PETITDIDIER,
Assistant Engineer.

Maj. JARED A. SMITH,
Corps of Engineers, U. S. A.

47TH CONGRESS, 1st Session. } SENATE. { EX. DOC. No. 24.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING

A communication from the Chief of Engineers, dated the 14th instant, covering copy of report, with accompanying maps, from Maj. John M. Wilson, Corps of Engineers, upon a survey of Maumee Bay for a straight channel from Toledo, Ohio, to the waters of Lake Erie.

DECEMBER 19, 1881.—Referred to the Committee on Commerce and ordered to be printed.

WAR DEPARTMENT,
Washington City, December 16, 1881.

The Secretary of War has the honor to transmit to the United States Senate, for the information of the Committee on Commerce, a communication from the Chief of Engineers, dated the 14th instant, covering copy of report, with accompanying maps, from Maj. John M. Wilson, Corps of Engineers, upon a survey of Maumee Bay for a straight channel from Toledo, Ohio, to the waters of Lake Erie, made in compliance with the requirements of the river and harbor act of March 3, 1881.

ROBERT T. LINCOLN,
Secretary of War.

The PRESIDENT *pro tempore*
of the United States Senate.

OFFICE OF THE CHIEF OF ENGINEERS,
UNITED STATES ARMY,
Washington, D. C., December 14, 1881.

SIR: I have the honor to submit herewith a copy of a report to this office, with accompanying maps, from Maj. John M. Wilson, Corps of Engineers, giving the results of a survey, under his direction, of Maumee Bay for a straight channel from Toledo, Ohio, to the waters of Lake Erie; made to comply with requirements of the river and harbor act of March 3, 1881.

Very respectfully, your obedient servant,

H. G. WRIGHT,
Chief of Engineers, Brig. and Bvt. Maj. Gen.

Hon. ROBERT T. LINCOLN,
Secretary of War.

SURVEY OF TOLEDO HARBOR, OHIO, FOR A STRAIGHT CHANNEL TO LAKE ERIE.

UNITED STATES ENGINEER OFFICE,
Cleveland, Ohio, November 19, 1881.

GENERAL: I have the honor to transmit herewith a chart of a portion of Maumee Bay, Toledo Harbor, Ohio, together with a profile along line of proposed new channel, and to submit the following report of a survey made under my direction in accordance with the act of March 3, 1881.

OBJECT OF THE SURVEY.

The act of Congress approved March 3, 1881, provides for an examination or survey at "Toledo, Ohio, for a straight channel to Lake Erie," and "estimates of cost of improvements proper to be made."

Early in July, I directed Principal Inspector James S. Lawrence, with the assistance of the crew of the United States scow used in the present work of improvement at Maumee Bay, to make a careful survey of a straight channel located by me, commencing just beyond the mouth of the Maumee River, in a depth of 17 feet water, and running on a straight line until the same depth was reached in Lake Erie.

The work was carefully and accurately done, the scow and crew being used for the purpose at such times as they could be best spared from the work of improvement then in progress upon the present circuitous channel leading from Toledo to deep water in Lake Erie.

TOLEDO HARBOR.

Although this harbor has been described several times in the reports of the Chief of Engineers to Congress, I deem it best to repeat the account of the work heretofore done and now in progress for its improvement.

The city of Toledo, Ohio, is situated at the mouth of the Maumee River; the river empties into Maumee Bay, at a point, by the way of the present channel, about 8 miles from the deep water of Lake Erie, the distance from the docks of Toledo to deep water in the lake being about 12 miles.

The attention of the general government was first called to this harbor by the act of June 23, 1866, wherein an appropriation of $20,000 was made for its improvement.

The depth of water in the channel of the Maumee River, then as now, varied from 17 to 25 feet, and this depth was maintained until the loss of velocity, as the water emptied into the bay, caused the materials in suspension to be deposited.

In 1866 the depth in the natural channel through Maumee Bay was only 11 feet, and it was so narrow that vessels could not pass each other.

Work was commenced excavating in the natural channel with the intention of obtaining a width of 200 feet and depth of 12 feet, and by the year 1868 this was accomplished as far as depth was concerned; increasing commerce and larger vessels, however, called for a greater depth, and in 1871 there was a narrow channel nearly completed through the bay with a depth of 14 feet.

In December, 1872, a Board of Engineers was convened at Toledo to carefully consider the subject of the improvement of the harbor. This Board submitted three plans of improvement, as follows:

1st. A straight cut from the mouth of Maumee River through North Cape Point, at a cost of $1,853,580.

2d. To extend Maumee River through the bay and North Cape Point to Lake Erie, confining the river bed in a new channel of about the same dimensions as its natural bed, at an estimated cost of $3,074,500.

3d. To improve the existing natural channel through Maumee Bay by widening it to 250 feet at surface and 200 feet at bottom, with a depth of 15 feet, at an estimated cost of $450,000.

The Board deemed the second plan the most complete solution of the problem before it, the result of which could be predicted with the most certainty; they recommended, however, the third plan, being influenced in its favor by the urgent necessity then existing that the improvement should be made in the shortest possible time, and the fact that either of the other plans would involve a delay of many years, even with large annual appropriations.

The recommendation of the Board was approved, and work has continued for the last eight years, dredging in the natural channel through the bay; by the act of Congress approved June 14, 1880, the depth to be gained was increased to 16 feet; the estimated cost of the additional work necessary to obtain this depth was $120,000; during the last two seasons operations have been in progress to gain a depth of 16 feet at low-water. At the close of the present season there was a channel with a width of 200 feet on the ranges and 300 feet at the angles, with a depth of from 15 to 17 feet from the mouth of the river to deep water in Lake Erie.

THE PRESENT PROJECTS.

The terms of the law under which the present survey and estimates have been made are plainly and explicitly given in the words "Toledo, Ohio, for a straight channel to Lake Erie."

The attention of the general government was first called to the necessity for a straight channel between Toledo and the lake by Col. T. J Cram in 1867, and in 1868 he submitted a plan and estimate for such a work; this plan was referred to a Board of Engineers convened in 1869, but was not approved, the Board recommending the improvement of the present channel throughout its entire length to a width of 200 feet and depth of 12 feet.

In the projects now presented, I have adhered to the first two plans suggested by the Board of Engineers in 1875.

FIRST PLAN.

This plan provides for excavating a channel between the mouth of the Maumee River and the depth of 17 feet in Lake Erie, upon a straight line following the general direction of the river proper, and cutting through the sand beach known as North Cape Point, at its narrowest part. This will be simply a cut through the bay, without revetment, and will make the length of the channel between Toledo and the depth of 17 feet in the lake about $1\frac{3}{4}$ miles less than by the present channel, and will avoid the circuitous route now difficult of navigation by day and dangerous for lack of proper beacons by night.

This new channel will necessitate the dredging of a canal 31,100 feet (nearly 6 miles) long, 250 feet wide, and 17 feet deep at low water; a portion of this will be cut through the peninsula of North Cape Point.

The increase and decrease of depth along the proposed line is very gradual and uniform both in the bay and the lake; the bottom in the bay is mud and clay; the neck of North Cape Point is of sand to a depth of about 6 feet and below that of clay; the bottom of the lake is of clay similar to that now found in dredging in the natural channel through the bay.

The estimated cost of this work is as follows:

2,123,390 cubic yards of dredging in the bay, at 20 cents per yard	$424,678
1,080,810 cubic yards of dredging in the lake, at 30 cents per yard	324,243
Contingencies, including inspectors, surveys, office expenses, &c., 10 per cent.	74,892
Total	823,813

This project includes neither revetments nor piers; it is probable that within the bay the dredged channel can be maintained without much trouble by the excavation annually of such deposits as may occur from materials brought down by the river.

Beyond North Cape Point, in the lake, it will be different, and the violent storms of the autumn and winter will cause the channel to be greatly reduced in depth from time to time, requiring, probably, extensive dredging each season, and more or less delay and annoyance to the large and growing commerce of the important city of Toledo.

THE SECOND PLAN.

This plan provides for extending Maumee River on a straight line through the bay and North Cape Point to Lake Erie, confining the river-bed in a new channel of about the same dimensions as its natural bed.

The amount of dredging will be identical with that in the previous plan. From the east side of the mouth of the river to North Cape Point a strong pile and timber dike should be run on the east side of the new channel as far as the inner end of the canal through North Cape Point, the height of the dike being such that the ice can pass out over the inner portion of it during freshets. No dike is deemed necessary on the west side of the channel until Nagg's Island is reached. From the southeast end of this island a similar dike should be run to the west side of the inner end of the canal through the peninsula, for the purpose of cutting off the flow through the opening between the island and the peninsula, and of directing the main volume through the new channel.

Between the main dike and the west shore, within the limits of the bay, the channel will gradually decrease in width from 4,000 feet at the mouth of the river, to 400 feet at the entrance to the canal through North Cape Point, a distance of about 4 miles.

The revetments of the canal across the peninsula will be 400 feet apart, and this width will be maintained between the piers, which will be run out to the depth of 17 feet in the lake. The estimated cost of this plan will be as follows:

Dredging 2,123,390 cubic yards within the bay, at 20 cents per yard	$424,678
Dredging 1,080,810 cubic yards in the lake, at 30 cents per yard	324,243
21,100 linear feet of dike, from Presque Isle Point, mouth of river, to the neck of the peninsula, at $11 per foot	232,100
3,100 linear feet of dike, from Nagg's Island to the neck of peninsula, at $11 per foot	34,100
6,600 linear feet of dike, on both sides of canal, through peninsula out to the depth of 8¾ feet in the lake, at $9 per foot	59,400
3,000 linear feet of pile-pier on both sides of channel, between depths of 8¾ feet and 12 feet in lake, at $26 per foot	78,000
7,200 linear feet of crib-pier, on both sides of channel, between depths of 12 and 13 feet in the lake, at $40 per foot	288,000
7,200 linear feet of crib-pier, on both sides of channel, between depths of 13 feet and 14.8 feet, at $45 per foot	324,000
7,600 linear feet of crib-pier, on both sides of channel between depths of 14.8 feet and 17 feet in lake, at $50 per foot	380,000
One outer crib for light-house, 40 feet by 40 feet by 26 feet	4,500
Contingencies, 10 per cent	214,902
Total	2,363,923

This second plan I look upon as the most satisfactory solution of the problem of properly improving the harbor of Toledo, Ohio.

COMMERCE OF TOLEDO, OHIO.

The rapid growth of the commerce of Toledo, and of the Great Lakes, is clearly shown in the very able report, for 1880, to the Toledo Produce Exchange of Mr. Denison B. Smith, from which I quote the following:

> The maximum capacity of sailing vessels on the lakes in 1841 was 4,500 bushels of grain. The size of vessels built has increased yearly. Eight years since (1872), the maximum had reached about 25,000 bushels. Since that date the very active competition with the rail lines has compelled a large increase in both steamers and sailing vessels, and now 75,000 bushels of wheat is not an uncommon cargo. But these large vessels with 2,250 tons of freight must be so constructed as to require a depth of water equal to 14 feet, and many of them 15 feet.

Since this report was printed a new vessel, the David Dows, has been launched at Toledo, whose carrying capacity is 100,000 bushels of corn, and which, when fully loaded, will draw about 16½ feet water.

From Mr. Smith's report I have obtained the following table of receipts of grain at Toledo:

Annual receipts of flour, wheat, &c., at Toledo, Ohio.

Year.	Flour.	Wheat.	Corn.	Oats.
	Barrels.	*Bushels.*	*Bushels.*	*Bushels.*
1876	536, 138	9, 016, 063	16, 334, 291	3, 418, 601
1877	556, 335	8, 151, 712	17, 589, 558	2, 540, 760
1878	751, 812	17, 497, 748	19, 265, 752	3, 699, 877
1879	801, 901	22, 501, 616	16, 133, 728	4, 046, 073
1880	877, 816	30, 047, 333	22, 213, 016	4, 348, 322

An examination of this table will show that in five years, or since the channel through the Maumee Bay has been made available for vessels of deeper draught, the receipts of flour have increased 63 per cent., of wheat, 233 per cent., of corn, 36 per cent., and of oats, 27 per cent. Of the wheat received, 40 per cent. was reshipped by lake in 1876 and 1877, 60 per cent. in 1878 and 1879, and 66 per cent. in 1880; in other words, 3,316,209 bushels were shipped *via* the lake in 1876, 12,788,414 bushels in 1879, and 19,828,549 bushels in 1880, an increase of nearly 500 per cent. in the wheat traffic *via* the lake in five years, and of 55 per cent. since 1879.

At present the largest vessel running out of Toledo has a capacity of 100,000 bushels of corn, and when so loaded will draw 16½ feet water.

The prospects for the rapid growth of the commerce of Toledo are most flattering, and the advantages of a straight channel, with a depth of 17 feet at low-water, can hardly be estimated.

Toledo is in the collection district of Miami; there is a fixed white light of the fourth order on Turtle Island, and three sets of range-lights for parts of the channel; the amount of commerce to be benefited by this improvement is large and rapidly increasing.

The amount of revenue collected during the calendar year 1880 was $24,154.68. The value of the imports was $72,529, and of the exports, $5,168,632.

Two thousand five hundred and fifteen vessels with an aggregate tonnage of 842,303 tons entered, and 2,499 vessels with an aggregate tonnage of 831,942 tons cleared, during the year.

I am, general, very respectfully, your obedient servant,

JOHN M. WILSON,
Major of Engineers, Bvt. Col., U. S. A.

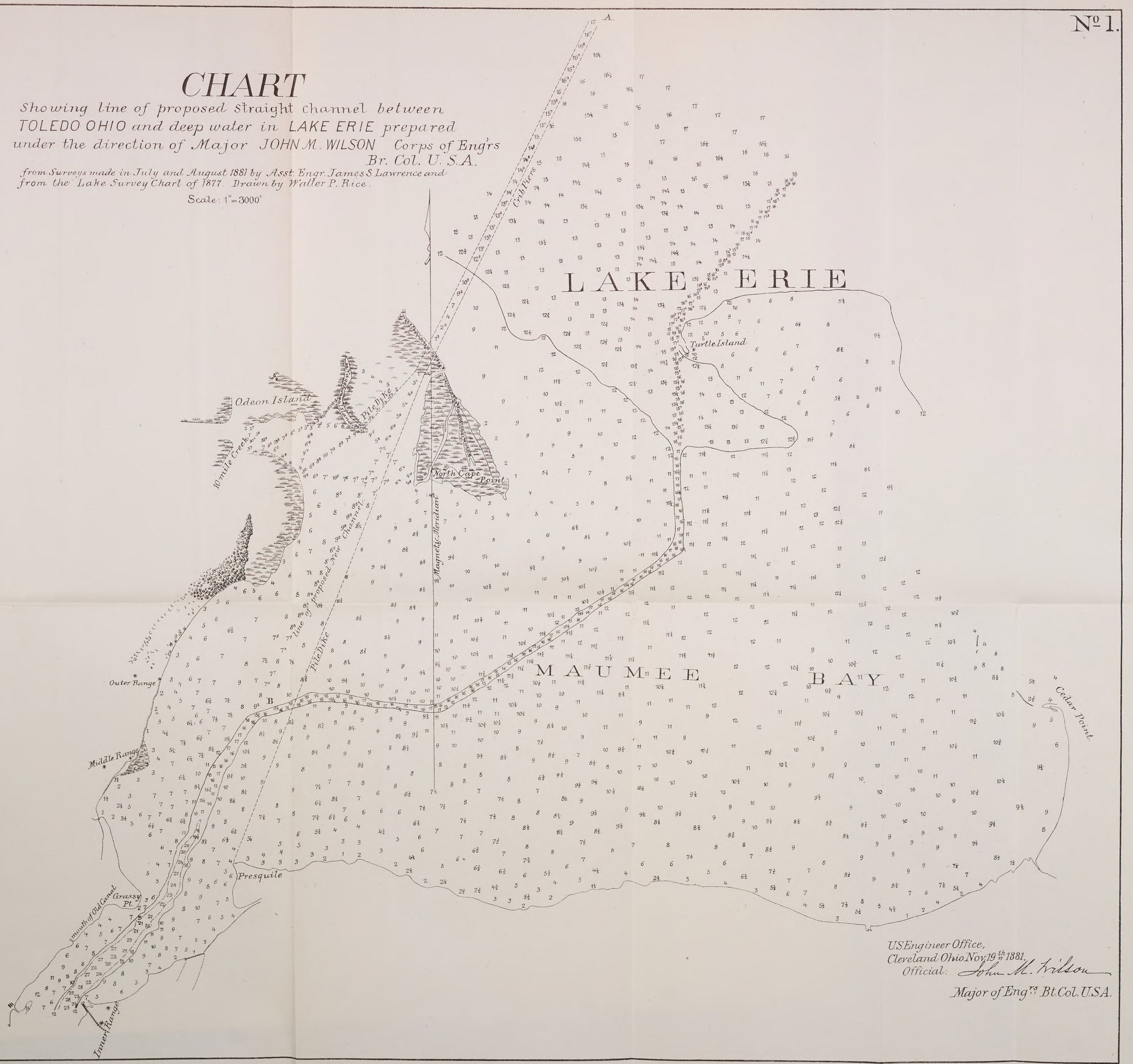
The CHIEF OF ENGINEERS, U. S. A.

CHART

Showing line of proposed straight channel between TOLEDO OHIO and deep water in LAKE ERIE prepared under the direction of Major JOHN M. WILSON Corps of Eng'rs Br. Col. U. S. A.

from Surveys made in July and August 1881 by Asst. Engr. James S. Lawrence and from the Lake Survey Chart of 1877. Drawn by Walter P. Rice.

Scale: 1" = 3000'

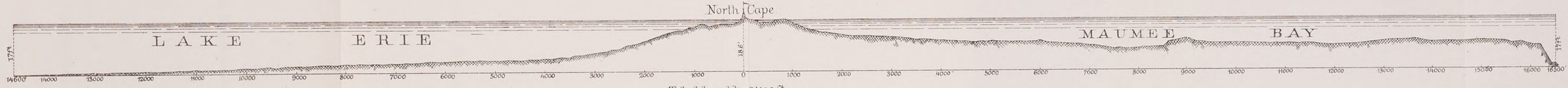


U.S. Engineer Office,
Cleveland Ohio Nov. 19th 1881.
Official: John M. Wilson
Major of Engrs Bt. Col. U.S.A.

CHART

showing Section on line of Proposed Straight Channel between
TOLEDO, OHIO
and deep water in
LAKE ERIE.

Prepared under the direction of
Major John M. Wilson
Corps of Engrs, Bt. Col. U.S.A.
From Soundings taken in July & August 1881. by
James S. Lawrence Asst. Engr.
Horizontal Scale: 1" = 1800'.
Vertical Scale: 1" = 30'.



Total lenght = 31100 ft.
Profile on line 'AB' of Chart No 1.

U.S. Engineer Office
Cleveland Ohio Nov. 19th 1881.
Official:
John M. Wilson
Major of Engrs Bt. Col. U.S.A.

Sen. Ex. Doc. No 24 1st Sess. 47th Cong.

47TH CONGRESS, 1st Session. } SENATE. { EX. DOC. No. 25.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING

A communication from the Chief of Engineers, dated the 14th inst., covering copy of report from Col. John Newton, Corps of Engineers, with accompanying map, upon the completion of the survey of Harlem River, New York, and through Harlem Kills to the East River, New York.

DECEMBER 19, 1881.—Referred to the Committee on Commerce and ordered to be printed.

WAR DEPARTMENT,
Washington City, December 16, 1881.

The Secretary of War has the honor to transmit to the United States Senate, for the information of the Committee on Commerce, a communication from the Chief of Engineers dated the 14th instant, covering copy of report from Col. John Newton, Corps of Engineers, with accompanying map, upon the completion of the survey of Harlem River, New York, and through Harlem Kills to the East River, New York, made in compliance with the requirements of the river and harbor act of March 3, 1881.

ROBERT T. LINCOLN,
Secretary of War.

The PRESIDENT *pro tempore*
of the United States Senate.

OFFICE OF THE CHIEF OF ENGINEERS,
UNITED STATES ARMY,
Washington, D. C., December 14, 1881.

SIR: To comply with the requirements of the river and harbor act of March 3, 1881, I have the honor to submit herewith a copy of a report to this office from Col. John Newton, Corps of Engineers, of the completion of the survey of Harlem River, New York, and through Harlem Kills to the East River, with accompanying map.

Very respectfully, your obedient servant,

H. G. WRIGHT,
Chief of Engineers, Brig. and Bvt. Maj. Gen.

Hon. ROBERT T. LINCOLN,
Secretary of War.

COMPLETING SURVEY OF HARLEM RIVER AND THROUGH THE HARLEM KILLS TO THE EAST RIVER, NEW YORK.

UNITED STATES ENGINEER OFFICE,
New York, October 8, 1881.

GENERAL: I have respectfully to report upon "completing survey of Harlem River and through the Harlem Kills to East River," as directed by the harbor and river act March 3, 1881, and to subjoin estimates for the proposed channel through the Harlem Kills.

The object of improving the channel through the Harlem Kills is to form a shorter and more convenient passage from the Harlem into the East River, than by following the course of the former to the present junction of the two rivers south of Ward's Island.

The proposed pier and bulkhead lines are laid down on the tracing sent herewith, leaving between these a channel way of 300 feet in width.

ESTIMATES FOR CHANNELS 300 FEET WIDE, 3,400 FEET LONG, AND FOR 18, 15 AND 12 FEET IN DEPTH AT MEAN LOW-WATER.

For a depth of 18 feet:	
Removal of mud, sand, gravel, &c., 238,400 cubic yards, at 75 cents	$178,800
Removal of rock, 275,800 cubic yards, at $12	3,309,600
Total	3,488,400
For a depth of 15 feet:	
Removal of mud, sand, gravel, &c., 210,300 cubic yards, at 75 cents	$157,725
Removal of rock, 170,557 cubic yards, at $12	2,046,684
Total	2,204,409
For a depth of 12 feet:	
Removal of mud, sand, gravel, &c., 172,300 cubic yards, at 75 cents	$129,225
Removal of rock, 86,000 cubic yards, at $12	1,032,000
Total	1,161,225

It is possible that a more elaborate survey than the funds devoted to the object warranted might diminish the estimate for rock excavation by proving the existence of large amounts of loose stone which could be removed at a much diminished cost.

For vessels propelled or towed by steam the channel might be reduced to a width of 200 feet at a proportionate diminution of cost.

It is thought that the depth of 15 feet would be sufficient; at all events, such depth would prove a great benefit to navigation.

Respectfully submitted.

JOHN NEWTON,
Colonel of Engineers.

Brig. Gen. H. G. WRIGHT,
Chief of Engineers, U. S. A.

Map of a Survey of HARLEM KILLS NEW YORK HARBOR made under the direction of COL. JOHN NEWTON, U.S. Eng'rs. August 1881.

Scale 1:1800

SOUNDINGS.

Soundings are expressed in feet and tenths and refer to Mean Low Water.

The 3 feet contour is shown thus: ——

" 6 " " " " " "

" 9 " " " " " "

" 12 " " " " " "

" 15 " " " " "

" 18 " " " " "

TIDES.

Mean Rise and Fall of Tides ..... 5.3 ft.

Note.

All Surface Soundings are shown in Black.

" Borings " " " Colors.

" Soundings & Borings which indicate Rock are shown in Red.

Veryhard " " " Blue.

Abreviations of Bottom.

st. sand.
gr. gravel
st. stones
br. boulder
md. mud

M O R R I S A N I A

H A R L E M R I V E R

C I T Y O F N E W Y O R K

L O N G I S L A N D S O U N D

R A N D A L L ' S I S L A N D

130th ST.

125th ST.

3rd AVE.

2nd AVE.

1st AVE.

A. AVE.

EXTERIOR PIER & BULKHEAD LINE — HARBOR COMMISSION 1875

PROPOSED EXTERIOR PIER & BULKHEAD LINE

PROPOSED EXTERIOR PIER & BULKHEAD LINE

BULKHEAD LINE

Sen. Ex. Doc. No. 25. 1st Sess. 47th Cong.

47TH CONGRESS, 1st Session. } SENATE. { EX. DOC. No. 26.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING,

In compliance with Senate resolution of the 14th instant, copy of report of Lieut. Col. G. K. Warren, Corps of Engineers, dated December 7, 1881, in regard to the condition of the government's wharf and docks at Block Island, Rhode Island.

DECEMBER 19, 1881.—Referred to the Committee on Commerce and ordered to be printed.

WAR DEPARTMENT,
Washington City, December 17, 1881.

The Secretary of War has the honor to transmit to the United States Senate, in compliance with the requirements of resolution of that body of the 14th instant, copy of report of Lieut. Col. G. K. Warren, Corps of Engineers, dated December 7, 1881, in regard to the condition of the government's wharf and docks at Block Island, Rhode Island.

ROBERT T. LINCOLN,
Secretary of War.

The PRESIDENT *pro tempore*
of the United States Senate.

OFFICE OF THE CHIEF OF ENGINEERS,
UNITED STATES ARMY,
Washington, D. C., December 16, 1881.

SIR: I have the honor to return herewith the resolution of the Senate of the United States of the 14th instant, referred to this office for report, directing the Secretary of War "to transmit to the Senate copy of the report made by Lieut. Col. G. K. Warren, Corps of Engineers, relative to the condition of the government's wharf and docks at Block Island," Rhode Island, and in obedience to its requirments to submit the accompanying copy of the report referred to.

Very respectfully, your obedient servant,

H. G. WRIGHT,
Chief of Engineers, Brig. and Bvt. Maj. Gen.

Hon. ROBERT T. LINCOLN,
Secretary of War.

GOVERNMENT WHARF AT BLOCK ISLAND, RHODE ISLAND.

ENGINEER OFFICE, UNITED STATES ARMY,
Newport, R. I., December 7, 1881.

GENERAL: In accordance with the indorsement on the communication from the Hon. Nelson W. Aldrich, in relation to the wharf at Block Island, I submit the following:

The government wharf referred to is the platform of spruce on the inside of the basin at Block Island. This is laid on spruce beams, one end of which rests on spruce timber cribs, the other upon oak piles. This as well as the basin itself was but a temporary structure, to aid in carrying on the main work and get immediate shelter. The whole is about rotted out.

During this season I had prepared an estimate for replacing the eastern side of the basin (which forms part of the main work) with masonry. It is important to have this done at once; it will require an outlay of $10,000. There is also a requirement that the cliffs to the east should be protected from further abrasion by the waves, to prevent the material washing into the area protected by the breakwater. For this I have estimated that 850 feet of cliff requires protection, at a probable expense of $8,500. When replacing the eastern side of the basin we can arrange to do away with the rotten spruce platform as it now is. But if anything is done to the rest of it, I would recommend patching it. The oak piles appear still good to last for some time. The patching can be done for $500. To replace the whole of the wharf or platform inside the basin will cost at least $5,000, if made of hard wood. But it would not be well to do it unless the north and west sides of the basin are rebuilt, and this would cost of itself $15,000. Better than this, it would be, to extend and increase the main breakwater so as to give shelter in that way. An expenditure of $35,000 more on the main work will enable the whole protected space to be used as the basin now is.

To recapitulate, I would recommend an appropriation at once—

For replacing the east side of the basin	$10,000
For protection to cliffs for saving the area sheltered by the breakwater	8,500
For patching the government wharf	500
	19,000

Very respectfully,

G. K. WARREN,
Lieutenant-Colonel of Engineers.

Bvt. Maj. Gen. H. G. WRIGHT,
Brig. Gen. and Chief of Engineers, U. S. A.

47TH CONGRESS, 1st Session. } SENATE. { EX. DOC. No. 27.

LETTER

FROM

THE SECRETARY OF THE INTERIOR,

TRANSMITTING

A copy of a letter from the Director of the United States Geological Survey to that Department, relative to rent of building for use of the survey, under act June 16, 1880.

DECEMBER 19, 1881.—Referred to the Committee on Appropriations and ordered to be printed.

DEPARTMENT OF THE INTERIOR,
Washington, December 16, 1881.

SIR: The act of Congress approved June 16, 1880, making appropriations for sundry civil expenses of the government, appropriated $150,000 for the expenses of the United States Geological Survey for the year ending June 30, 1881. Under the authority of that act, my predecessor rented the building 803 G street, northwest, in this city, for the use of the survey, for the year ending June 30, 1881, at the rate of $125 per month. The First Comptroller of the Treasury holds that the act referred to did not authorize the renting of a building for the use of the survey. This decision was based upon a provision of the deficiency appropriation act approved June 22, 1874. (Statutes at Large, vol. 18, page 144.) The disbursing officer of the survey has paid the rent to the 28th of February, 1881. The Comptroller has declared the payment illegal, and the account is therefore suspended.

The survey has continued to occupy the building referred to up to this time, and its use is essential to the prosecution of the work. I have the honor, therefore, to recommend that the department be authorized to pay the rent of said building for the years ending June 30, 1881, and June 30, 1882, from the appropriation for the expenses of the United States Geological Survey.

A copy of a letter from the director of the survey to this department upon the subject is herewith inclosed.

Very respectfully,

A. BELL,
Acting Secretary.

The PRESIDENT *pro tempore*
of the United States Senate.

DEPARTMENT OF THE INTERIOR,
UNITED STATES GEOLOGICAL SURVEY,
Office of the Director, Washington, D. C., Dec. 8, 1881.

SIR: I have the honor to call your attention to a decision of the First Comptroller of the Treasury, bearing date April 5, 1881, a copy of which is inclosed. This decision relates to the payment of rent for the building numbered 803 G street, northwest, in this city, used as an office for the United States Geological Survey. In this decision the Comptroller says "there is no law authorizing the Secretary of the Interior to rent buildings for this purpose for the fiscal year ending June 30, 1881; nor is there any appropriation applicable to pay such rent."

On the 9th of July, 1880, a contract was made by the Secretery of the Interior with the owner of said building for the rent of the same, extending from July 1, 1880, to June 30, 1881, inclusive; and in the lease executed it was agreed that the sum of $1,500, in monthly installments of $125, should be paid for the same.

Under this lease Mr. John D. McChesney, chief disbursing clerk, United States Geological Survey, paid rent for eight months—from July 1, 1880, to February 28, 1881—amounting to $1,000.

In the decision, rendered above, this payment was declared illegal and the account suspended. Since that time no payments have been made, but the amount necessary to complete the payments for the fiscal year ending June 30, 1881, has been received subject to Congressional legislation.

At the beginning of the present fiscal year a verbal agreement was entered into between the owner of the building and the Director of the Geological Survey, by which the survey was to continue in the occupancy of the building without giving said owner a legal claim against the government for the rent thereof, he expressing his willingness to abide the action of Congress in the matter.

As the occupancy of this building is essential to the prosecution of the work of the survey, I would respectfully request the honorable the Secretary of the Interior to ask of Congress the necessary legislation to authorize the payment of the rent for the fiscal years above mentioned.

I am, with respect, your obedient servant,

J. W. POWELL, *Director*.

The Hon. the SECRETARY OF THE INTERIOR.

47TH CONGRESS, 1st Session. } SENATE. { EX. DOC. No. 28.

LETTER

FROM THE

SECRETARY OF THE INTERIOR,

TRANSMITTING

A copy of communication from the Commissioner of Indian Affairs, and accompanying statement showing disposition of clothing purchased from appropriation, not specifically appropriated for under treaties with various tribes.

DECEMBER 14, 1881.—Referred to the Committee on Indian Affairs.
DECEMBER 20, 1881.—Reported back by Mr. Dawes, ordered to be printed, and recommitted to same committee.

DEPARTMENT OF THE INTERIOR,
Washington, December 13, 1881.

SIR: In compliance with provisions of Indian appropriation act, approved May 11, 1880 (U. S. Statutes, vol. 21, p. 131), I transmit herewith copy of communication, dated November 23, 1881, from the Commissioner of Indian Affairs, and accompanying statement showing disposition of additional clothing purchased from appropriation of $45,000 and not specifically appropriated for under treaties with various tribes.

Very respectfully,

S. J. KIRKWOOD,
Secretary.

The PRESIDENT *pro tempore*
of the United States Senate.

DEPARTMENT OF THE INTERIOR,
OFFICE OF INDIAN AFFAIRS,
Washington, November 23, 1881.

SIR: In order to enable you to comply with the requirement of the act of Congress appropriating the sum of $45,000 for additional clothing for various Indian tribes for the fiscal year ending June 30, 1881, approved May 11, 1880 (U. S. Stats., vol. 21, p. 131), I have the honor to inclose herewith a statement showing the disposition made of said amount, with the names of the Indian tribes and the amount expended for each respectively.

Very respectfully,

H. PRICE,
Commissioner.

The Hon. SECRETARY OF THE INTERIOR.

Statement showing the names of Indian tribes, and amounts expended for each respectively, from the appropriation of forty-five thousand dollars ($45,000) *made for the purchase of additional clothing, not specifically appropriated for under treaties with various Indian tribes for the fiscal year ending June* 30, 1881, *as required by act of Congress approved May* 11, 1880 (*U. S. Stats., vol.* 21, *p.* 131).

TRIBES.	
Shoshones, in Nevada	$6,511 35
Pai-Utes, in Nevada	1,060 64
Chippewas of Lake Superior, Wis	2,801 98
Chippewas of the Mississippi, Minn	263 46
Indians at Quapaw Agency, Indian Territory	2,734 36
Bannocks and Sheepeaters at Lemhi Agency, Idaho	1,697 58
Modocs, Indian Territory	1,099 42
Indians at schools, not provided for under treaty stipulations	5,575 20
Wichitas, Indian Territory	9,949 15
Nez Perces of Joseph's Band, Indian Territory	3,596 52
Apaches of Arizona and New Mexico	9,710 34
Total	45,000 00

47TH CONGRESS, 1st Session. } SENATE. { EX. DOC. No. 29.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING

A Communication from the Chief of Engineers, dated the 17th instant, covering copy of report from Maj. Walter McFarland, Corps of Engineers, upon a survey of Sackett's Harbor, New York.

DECEMBER 20, 1881.—Referred to the Committee on Commerce and ordered to be printed.

WAR DEPARTMENT,
Washington City, December 19, 1881.

The Secretary of War has the honor to transmit to the United States Senate, for the information of the Committee on Commerce, a communication from the Chief of Engineers, dated the 17th instant, covering copy of report from Maj. Walter McFarland, Corps of Engineers, upon a survey of Sackett's Harbor, New York, made in compliance with the requirements of the river and harbor act of March 3, 1881.

ROBERT T. LINCOLN,
Secretary of War.

The PRESIDENT *pro tempore*
of the United States Senate.

OFFICE OF THE CHIEF OF ENGINEERS,
UNITED STATES ARMY,
Washington, D. C., December 17, 1881.

SIR: I have the honor to submit herewith a copy of a report to this office, with map, of the results of a survey of Sackett's Harbor, New York, made under the direction of Maj. Walter McFarland, Corps of Engineers, to comply with the requirements of the river and harbor act of March 3, 1881.

Very respectfully, your obedient servant,

H. G. WRIGHT,
Chief of Engineers, Brig. & Bvt. Maj. Gen.

Hon. ROBERT T. LINCOLN,
Secretary of War.

SURVEY OF SACKETT'S HARBOR, NEW YORK.

UNITED STATES ENGINEER OFFICE,
Oswego, N. Y. October 18, 1881.

GENERAL: I have the honor to report as follows upon the examination or survey of Sackett's Harbor, New York, ordered by act of Congress approved March 3, 1881, and assigned to my charge by letter from your office, dated March 21, 1881.

Inquiry shows that the shoalness of the harbor restricts the lake commerce of the port chiefly to vessels drawing from 6 to 9 feet water; vessels drawing from 9 to 11 feet are used to some extent, but their cargoes have to be lightered. It is desired by those interested in the commerce of the port that the harbor should be deepened sufficiently to admit the largest vessels that will be able to pass the Welland Canal when it is completed; that is, vessels drawing 14 feet water. It (the canal) is now fitted for the passage of vessels drawing 12 feet water.

To determine the amount of material which would have to be removed in order to secure these depths at Sackett's Harbor, a survey instead of an examination was needed and was authorized. This survey was made by Assistant Engineer Maurice Kingsley, a copy of whose report, with the map accompanying it, is sent herewith. His report shows that to deepen the whole harbor within the line indicated on his map to 12 feet at low-water would require the removal of about—

22,000 cubic yards of hard material, at 75 cents per cubic yard	$16,500
27,000 cubic yards of soft material, at 25 cents per cubic yard	6,750
Contingencies, about 25 per cent	5,750
Total	29,000

To deepen it to 16 feet, which would be necessary for the admission of vessels drawing 14 feet, in stormy weather, would require the removal of about—

52,000 cubic yards of hard material, at 75 cents per cubic yard	$39,000
61,600 cubic yards of soft material, at 25 cents per cubic yard	15,400
The pier work for which Mr. Kingsley furnishes an estimate not being needed at present, is omitted.	
Contingencies, about 25 per cent	13,600
Total	68,000

As the Welland Canal is not likely to be adapted for the passage of vessels drawing 14 feet for a number of years to come, I do not think it necessary to consider this last estimate at present.

If, instead of removing all the material lying within the limits of Mr. Kingsley's survey, we omit that which lies within 50 feet of the wharves, the total amount which it would be necessary to remove in order to give a depth of 12 feet at low-water would be reduced about 10,000 cubic yards, and the estimate would be as follows:

About 15,700 cubic yards of hard material, at 75 cents per cubic yard	$11,775
About 23,300 cubic yards of soft material, at 25 cents per cubic yard	5,825
	17,600
Contingencies, about 25 per cent	4,400
Total	22,000

This amount of money would make a good harbor of it.

For details of the commerce of the port, attention is invited to the report of Mr. Kingsley.

The number of arrivals during the past year from points outside of the collection district was 190; the amount of their tonnage being 9,000 tons.

The number of departures was about the same.

The number of arrivals and departures of vessels running to points within the collection district was about the same as the number running to points outside of the district.

The amount of revenue from customs collected during the year was $2,500.

The value of the imports and exports was about $400,000; the imports and exports consisting chiefly of lumber, shingles, fish, corn, barley, and wheat.

The amount of express matter and freight forwarded from Sackett's Harbor over the Utica & Black River Railroad during the year was about 8,000 tons.

Very respectfully, your obedient servant,

WALTER McFARLAND,
Major of Engineers.

Brig. Gen. H. G. WRIGHT,
Chief of Engineers, U. S. A.

REPORT OF MR. MAURICE KINGSLEY, ASSISTANT ENGINEER.

UNITED STATES ENGINEER OFFICE,
Oswego, N. Y., September 30, 1881.

MAJOR: In accordance with your instructions of September 19, 1881, I proceeded to Sackett's Harbor, New York, to make an examination of the harbor, and have respectfully to report as follows:

So far as I could learn from the inhabitants, the first improvement of Sackett's Harbor was made by the Navy Department in about 1810, when a L pier, 300 feet, was built upon the east end of Shiphouse Island, which was then wholly detached from the mainland, and a small crib sunk on the south end of the shoal in the middle of the harbor.

In 1812 some gun-boats were built there by the Navy Department, and a first-rate line-of-battle ship, which, however, was not launched.

In 1826–'28 $6,000 was appropriated for dredging, which was carried on from 1827 to1829 inside the harbor; what depth of water was obtained, and where in the harbor the dredging took place, I was unable to ascertain.

Between 1825 and 1850 the Navy Department connected Shiphouse Island with the mainland by a causeway, protected on each side with crib-work.

In 1850 further improvements were projected, and a dredge again brought there; but little or no work was done and nothing has been done since.

Appropriations to date (see River and Harbor Records):

May 20, 1826. For cleaning out and deepening harbor at Sackett's Harbor, New York	$3,000
May 23, 1828. For cleaning out and deepening harbor at Sackett's Harbor, New York	3,000
Total	6,000

The records of the Navy Department would doubtless furnish valuable data as regards the harbor.

The principal industry of Sackett's in bygone years was ship-building. The Navy Department established a yard there at the beginning of the century, but no building has been done since 1812.

Building by private parties was kept up till about ten years ago, when the decrease of oak timber in the surrounding district made it impossible to compete with the western ship-yards.

At present the trade comes from the lake, viz, barley, corn, wheat, lumber, coal, and fish, which is transshipped at Sackett's on to the Utica & Black River Railroad.

The following is the approximate estimate of its trade for the fiscal year ending June 30, 1881. It is due to say that this does not take into consideration the coasting trade carried on inside its own collection district, which extends from Sandy Creek to Alexandria Bay:

Lumber	feet, B. M..	1,500,000
Lath	No..	410,000
Shingles	No..	1,200,000
Wood	cords..	750
Coal	tons..	2,150
Fish	tons..	850
Corn	bushels..	40,000
Barley	bushels..	30,000
Wheat		

During the two fiscal years of 1879 and 1880 a total of 230,476 bushels of wheat and 137,959 bushels of corn was received; *but owing to the low-water* during the fiscal year ending June 30, 1881, very little wheat and corn had been received, as the wheat and corn comes in vessels drawing 11 to 12 feet. Mr. Hammond, who is interested in this business, assured me that for the past ten years his average yearly business had been 120,000 bushels of wheat and 70,000 bushels of corn, and that as soon as the harbor was improved so as to admit of vessels of 11 and 12 feet draught he would commence it again.

The Utica & Black River Railroad has shipped from Sackett's, in the fiscal year ending June 30, 1881, as follows: Freight, 14,899,566 pounds; express, 717,714 pounds. Of this about three quarter comes from the lake.

The collector reports as follows for the same year: Number of entries from other districts, 190; number of clearances from other districts, 182. Total tonnage of vessels arrived, 9,000 tons. Customs collected, $2,500.

The number of arrivals and departures to and from other ports within the district would more than equal the number from other districts, but the class of vessels is smaller.

The average yearly value of imports and exports is about $400,000.

The town of Sackett's has a population of about 900. Madison Barracks are situated on the edge of town limits.

The nearest light-house is Sackett's Harbor Light (fixed white), fifth order, situated on Horse Island, 1⅓ miles west of town.

The harbor is situated on the south side of Black River Bay and is bounded on two sides by the mainland and on the third by Shiphouse Peninsula. The mouth faces north-northeast, up and across the bay, which, there, is from 1 to 2 miles across.

Though small, it is naturally a very good harbor. Outside, also, there is good holding ground for vessels, as the Galloo and Stoney islands protect the mouth of Black River Bay.

From Shiphouse Point a bar runs south into the harbor for about 400 feet, and to within 200 feet of the wharves. It is composed of gravel, compact sand, and loose rock, and at extreme low-water has from one to two feet of water on it; from its looks and the compactness of its formation, I do not think that this is a bar formed since the harbor was made, but that it is a part of Shiphouse Island.

A map I saw in Sackett's, made by Captain Brown of the Navy, in 1850, shows this bar in precisely the same position as to-day, and giving about the same soundings when reduced to our standard.

The old crib, at the south end of the bar, also shown in the map of 1850, has rotted away, and I could find no trace of timbers; but its place was marked by the stone filling, which is very much larger than other stone about the harbor.

The descent from the edge of the bar is exceedingly abrupt all round it, the slope in some cases being one upon one.

On the inner or western side of this bar is a basin with an average of 9 feet soundings at low-water. The bottom is a soft, fine, blue mud, of from 7 to 10 feet in depth.

Close to the east side of the bar is the channel, about 200 feet wide, and giving 20 feet soundings on a mud bottom at the northeast end and 9 feet soundings on mud at the southwest end. East of this channel, and south up to the face of the wharves, soundings average 11 to 8 feet, and the bottom is mud, compact sand with loose stone, gravel, and a few logs.

Logs are scattered all over the harbor, and in the western basin there are a number of old timbers and three wrecks; the two largest of the latter do not interfere with navigation.

Eastward of the end of the line of railroad docks bed-rock crops up at about 15 feet low-water; but although it was not possible to drive an iron rod down, with three men, to 16 feet through the gravel in places, I am certain no rock will be struck in the harbor proper at 16 feet low-water.

I was told that the harbor had filled in from two sources: 1st, with bowlders and stone working along the shore from the westward, and, 2d, from sawdust coming down from Black River.

From the appearance of the bar inside the harbor and the channel, I do not think much stone comes from the westward, if any; but it is caught on the shoal north of Shiphouse Point before reaching the harbor. An examination of this shoal showed that it is increasing to the westward, but not to the northward, and is not an obstruction to navigation.

In the mud no traces of sawdust could be found; but I have no doubt that it is entirely composed of decayed sawdust and vegetable matter coming down Black River.

The sand, gravel, and loose stone on the southeast and south of the harbor also comes down the river, I believe; though along the face of the wharves the stone-filling working out of them has helped to shoal the water.

The shoal putting out north and northeast of the east end of the railroad dock has

from 10 to 13 feet water on it. The line of soundings taken over it are in the shoalest water; and inside, to the southward, there is better water.

So far as I could ascertain, this shoal is making slowly; but, with the present commerce, is not, and will not be for a number of years, an obstruction to navigation, unless vessels of 14 feet draught, requiring 16 feet water, were used. In that case I should advise building a pier along it due north from the east end of the railroad wharf to the 16-foot curve, which would make it 300 feet long.

This would give protection to the wharves and harbor, and also assist vessels in getting in and out of the harbor.

The ordinary draught of vessels coming into Sackett's is 6 to 9 feet; but the coal, grain, and lumber vessels, of which about 40 enter yearly, draw 9 to 11 feet; and, were there water, this number would be increased. The large vessels are at present lightened in to the wharves.

The south point of the bar makes it awkward for vessels getting up to and out from Hall's coal dock. As it is not sufficiently high to act as a protection, I should recommend that 150 feet of the south end be cut away, and a pier built out from the end of Shiphouse Point to the end. This would be of great service to vessels getting in and out of the harbor, as they could warp in and out. It would, also, serve as a protection for the inner harbor; but, as in the case of the other pier, it is not at present a necessity.

SCHEME FOR IMPROVING SACKETT'S HARBOR FOR VESSELS DRAWING 14 FEET AND REQUIRING 16 FEET WATER (SEE SKETCH SHOWING AREA TO BE DREDGED).

Dredging:	
Hard material, 52,039 cubic yards, at 75 cents	$39,030
Soft material, 62,379 cubic yards, at 25 cents	15,595
Piering:	
300 feet piering on East Shoal, at $20 per linear foot	6,000
250 feet piering on bar, at $15 per linear foot	3,750
Contingencies, 25 per cent	15,625
Total	80,000

This expenditure, however, is unwarranted till the Welland Canal is enlarged to admit vessels of 14 feet draught, and I therefore submit an estimate for deepening Sackett's Harbor to 12 feet at low-water, which would give 14 feet at ordinary lake level, and be sufficient to take in the present full-sized Welland Canal boats, and which the commerce of the harbor requires.

ESTIMATE FOR DREDGING TO 12 FEET.

Hard material, 21,983 cubic yards, at 75 cents	$16,487
Soft material, 26,815 cubic yards, at 25 cents	6,704
Contingencies, 25 per cent	5,809
Total	29,000

Should any appropriation be made, I would respectfully advise that the dredging commence at the east and work westward, and that the bar be dredged last.

From the amount of logs and stone scattered through the mud, and the mud mixed in with the sand, I would suggest that the parties bidding on the dredging in the harbor should be required to make one price to cover all classes of material, in order to avoid questions of classification.

A water-gauge was established by the Navy Department at Sackett's it about 1850, taking the then surface of the water as zero, when the lake was extremely high.

Assistants Ford and Judson sent me the readings of the Oswego gauge from September 19–26, and I established a gauge at Sackett's, on Hall's wharf, with the zero reduced to that of the Oswego gauge. This was 4.9 feet below the zero of the old gauge, and 7.5 feet below a bench-mark of the lake survey on a limestone rock 100 feet west of gauge.

* * * * * * *

Very respectfully, your obedient servant,

MAURICE KINGSLEY,
Assistant Engineer.

Maj. WALTER MCFARLAND,
Corps of Engineers, U. S. A.

U.S.N. Boat House

Old line of battle Ship The New Orleans.

Shiphouse Point

Wreck

Wreck

Mud

Wreck.

Magnetic

16′ Mud-line.

12′ Mud-line.

Gravel.

Bed Rock ○ at 15 feet

U.S. Watergauge

Hall's Dock

Position of old crib

Mud

Gravel

Eveleigh's Dock

Gravel

Rail Road Dock and Lumber Yards

Warehouse Dock

Jeffrey's Dock

Rail Road Depot

100 75 50 25 0 100 200 300

Sketch of Sackets Harbor N.Y.

to accompany report of examination made

Sept. 19–26. 1881.

Soundings read to feet and fourths of feet and are reduced to Zero of Gauge or extreme low water

surveyed by Maurice Kingsley

Area to be dredged enclosed in lines marked ——·——·——

Mud area at 16 feet " " " " .....

" " 12 " " " " " ----------

U.S. Engineer Office
Oswego N.Y. - October 18th 1881
Sent to Chief of Engineers Washington D.C.
with letter of this date - Walter McFarland
Major of Engineers

Sen. Ex. Doc. No 29. 1st Sess. 47th Cong.

47TH CONGRESS, 1st Session. } SENATE. { EX. DOC. No. 30.

LETTER

FROM THE

SECRETARY OF THE INTERIOR,

TRANSMITTING,

In compliance with a Senate resolution of the 15th instant, a copy of the report of the Rev. Sheldon Jackson, D. D., upon the condition of education in Alaska.

DECEMBER 20, 1881.—Referred to the Committee on Education and Labor and ordered to be printed.

DEPARTMENT OF THE INTERIOR,
Washington, December 19, 1881.

SIR: In compliance with a resolution of the Senate, passed on the 15th instant, I have the honor to inclose herewith a copy of the report of the Rev. Sheldon Jackson, D. D., upon the condition of education in Alaska.

Very respectfully,

S. J. KIRKWOOD,
Secretary.

The PRESIDENT OF THE SENATE.

DEPARTMENT OF THE INTERIOR,
BUREAU OF EDUCATION,
Washington, D. C., December 17, 1881.

SIR: I have the honor to acknowledge the receipt of the following Senate resolution of the 15th instant:

Resolved, That the Commissioner of Education be directed to transmit a copy of the report of Rev. Sheldon Jackson, D. D., upon the condition of education in the Territory of Alaska.

In compliance with the above resolution, I hereby transmit the report named for the use of the Senate.

Very respectfully, your obedient servant,

JOHN EATON,
Commissioner.

The Hon. the SECRETARY OF THE INTERIOR.

EDUCATION IN ALASKA.

DEPARTMENT OF THE INTERIOR,
BUREAU OF EDUCATION,
Washington, April 4, 1881.

DEAR SIR: If you have any further information to communicate respecting education in Alaska, I shall be pleased to receive it for my forthcoming report.

Very truly, yours,

JOHN EATON,
Commissioner.

REV. SHELDON JACKSON, D. D.,
Galesburg, Ill.

GALESBURG, ILL., *December* 1, 1881.

DEAR SIR: I have delayed replying to your request of April 4, that I might include the results of my third trip to Alaska. During this trip my views have been so strengthened concerning the great and urgent need of increased educational advantages in that section, that I feel a full review of the past and present situation is demanded; and the more so as the United States Senate, on the 2d of January, 1881, took the following action:

Resolved, That the Committee on Education and Labor be instructed to inquire what, if any, provisions have been made for the instruction of youth in Alaska, and what, if any, additional measures are required for that purpose, and to report the same by bill or otherwise.

EDUCATION UNDER THE RUSSIAN GOVERNMENT.

Information concerning Russian schools in Alaska is very meagre, the only available source to the English reader being the admirable work of William H. Dall, "Alaska and its Resources," pages 351 and 352. The first European settlers were Russians, attracted by the valuable furs and skins. Many of these married Indian women and raised families of mixed blood or creoles. As these children increased and grew up there began to be on the part of some of the fathers a felt need for schools. Accordingly, Gregory Shéhkoff, governor of the colony and founder of the Russian-American Fur Company, established a school at Kadiak, about the year 1792, which was taught by the trader. In 1793, Catharine II, Empress of Russia, issued a ukase ordering missionaries to be sent to her North American Colony.

In accordance with this order, the following year eleven monks sailed from Ochotsk for Kadiak Island, in charge of Archimandrite Joasaph, elder in the order of Augustin Friars, who were expected to take charge of schools as well as churches. In 1805, the imperial chamberlain and commissioner, Count Nikolai Resánoff, organized a school at Kadiak,

INDIAN GIRLS, ALASKA.

"SUSIE,"
A Hydah Indian Girl, Alaska.

under the name of the "House of Benevolence of the Empress Maria," in which were taught the Russian language, arithmetic, and the Greek religion.

About the same time a school was opened at Sitka, with a very precarious existence until 1820, when it came under the charge of a naval officer, who kept a good school for thirteen years. In 1833 this school came under the direction of Etolin, who still further increased its efficiency. Etolin was a creole, who, by the force of ability and merit, raised himself to the highest position in the country, that of chief director of the Fur Company and governor of the colony. He was a Lutheran, the patron of schools and churches. While governor he erected a Protestant church at Sitka, and presented it with a small pipe organ, which is still in use.

In 1825, Veniaminoff, who afterwards became the metropolite of Moscow, established a school for natives and creoles at Unalashka. In 1860 it reported 50 boys and 43 girls. This school is still in existence, but with a small and irregular attendance. For the use of the schools, Veniaminoff prepared an alphabet and grammar in the Aleutian language. In 1837 a school was established for girls, children of the employés of the Fur Company, and orphans. In 1842 it had 42 pupils, and 22 in 1862, when disbanded.

In 1841 a school was opened at Sitka for the training of priests. Instruction was given in the Russian and English languages, religion, arithmetic, geometry, navigation, trigonometry, geography, bookkeeping, and history. In 1859 arrangements were perfected for a general colonial school, which was opened in 1860 with twelve boarding pupils. Four of these were sons of priests and eight intended for the public service. A few day scholars were admitted free. After five years' schooling, the students for the public service were required to serve the Fur Company for fifteen years at a nominal salary. When suspended in 1862, the school contained 27 pupils, only 9 of whom were studying navigation. The annual cost of the school was $5,800. In 1843 the priest at Nushergak reports a school with 12 scholars.

On Spruce Island a Russian monk kept a school for thirty consecutive years for giving instruction in the rudimentary arts and agricultural industries.

In 1860 a school is reported on Amlia Island, with 30 in attendance. All these schools have been discontinued. A school-house was erected on the lower Yukon, but never used. The result of these schools, especially among the Aleuts, is thus summed up by Hon. W. S. Dodge, of Sitka:

> Nearly all of them read and write. Around their homes, in their churches and schools are seen many if not all the concomitants of ordinary American homes. Many among them are highly educated, even in the classics. The administration of the Fur Company often reposed great confidence in them. One of their best physicians was an Aleutian; one of their best navigators was an Aleutian; their best traders and accountants were Aleutians.

EDUCATION SINCE THE PURCHASE.

In 1867 Alaska, with its inhabitants, became a part of the United States. The schools sustained by the Fur Company, representing the Russian Government, were disbanded. It was reasonable, however, to suppose that 30,000 people would be much better off and have better schools under American than Russian rule. It was but reasonable to expect that the United States, that bases its continued existence upon

the intelligence of its citizens, and glories in its common-school system, would replace the disbanded Russian schools with those of a higher grade and improved methods; that a people who, through their State systems, practically furnish a free education to all, and through their general government appropriate thousands of dollars annually for Indian education and civilization, would not neglect to extend school privileges to the natives of their latest acquired territory; for whatever may have been the views held as to the expediency of the purchase, all will admit that, having acquired, the government is bound to care for it.

But these reasonable and just expectations have not been realized. The government, with two exceptions, that will hereafter be mentioned, has done nothing. The schools once taught by the Russian priests have one after another died, until only two remain—those of Unalashka and Belkovsky—and, according to the census of 1880, the average attendance at these is less than ten of both sexes. They are also irregularly kept. If only one or two appear at school time, the session is adjourned until more arrive, or even to the next day. No English is taught, and only the rudiments of Russian. The children of those who learned to read and write in the Russian schools, deprived of schools by the neglect of the government, are left to grow up in ignorance, until, among the 7,000 or 8,000 members of the Greco-Russian Church, the census reports less than 400 able to read or write in the Aleutian, Kadiak, or Russian languages. Outside of the Aleuts and a few at Sitka, among the Eskimos and Indian population none can read or write except those that, during the past four years, have attended the schools established by the Presbyterian Church in Southeastern Alaska.

For ten years after the purchase, the entire population, with the exception of the two small Russian schools previously mentioned and two small ones on the Seal Islands, was left without any educational opportunities whatever.

In 1877 my attention was earnestly called to this state of things, and since that time I have secured for the board of home missions of the Presbyterian Church the establishment of five schools in Southeastern Alaska. The movement, however, commenced from without and was the result of mission schools among the neighboring tribes in British Columbia.

FORT WRANGEL SCHOOLS.

In the spring of 1876 nine Tsimpsheau Indians came up the coast from Fort Simpson, British Columbia, and took a contract for cutting wood for the military post then at Fort Wrangel, Alaska. On the Sabbath, as was their custom, they gathered for worship. They found a warm friend in Capt. S. P. Jocelyn, of the Twenty-first United States Infantry, who was then in command at that station. He assisted them in procuring a room for Sabbath worship and protected them from interruptions. He also supplied them with some small hymn-books sent to the fort by the American Tract Society. At the close of their contract, in the fall, as they were about returning to Fort Simpson, Clah, who had been the leader among these Indians, was persuaded to remain and open a school. Such was the anxiety of the people to learn, that his school was attended by 60 to 70 adults besides children. "These people," said a sailor "are crazy to learn. Going up the beach last night, I overheard an Indian girl spelling words of one and two syllables. Upon looking into the house, I found that, unable to procure a school-book, she was learning from a scrap of newspaper that she had picked up."

Touched by the eagerness of this people to learn, a soldier at the post

INDIAN GIRLS IN THE "McFARLAND HOME," FORT WRANGEL, ALASKA.

wrote to Major-General Howard, then in command of that military district, asking if some society could not be interested to send them a competent teacher. The letter was placed in my hands in May, 1877, and immediately published in the Chicago Tribune. Soon after it was published in the leading Presbyterian newspapers of the country, with a call for a teacher.

To gain a better understanding of this movement of the natives for a school, I made them a visit in August, 1877. In passing through Portland I found a teacher who had had large experience in mission work and Indian schools—Mrs. A. R. McFarland—whom I took with me. Going ashore upon our arrival, August 10, I heard the ringing of the bell for the afternoon school, and went direct to the school-house.

About twenty pupils were in attendance, mostly young Indian women. Two or three boys were present; also a mother and her three little children. As the women took their seats on the rough plank benches each one bowed her head in silent prayer, seeking divine help on their studies. Soon a thoughtful Indian man of about twenty-five years of age came in and took his seat behind the rude desk. The familiar hymn, "What a friend we have in Jesus," was sung in English; a prayer followed in the Chinook jargon, which is the common language of the various tribes on this coast, closing with the repetition, in concert, of the Lord's Prayer in English. After lessons were studied and recited, the school arose, sung the long-meter doxology, and recited in concert the benediction. Then the teacher said "Good afternoon my pupils," to which came the kindly response, "Good afternoon, teacher."

The school was in full operation, but under great difficulties. They greatly needed maps and charts; they were also in great need of a school-house. At the time of my visit they were renting a dance-hall for a school-room. Upon the return of the miners for the winter, the hall had to be given up, and the school was held in a dilapidated log-house. I found that their stock of books inventoried as follows: four small bibles, four hymn-books, three primers, thirteen first readers, and one wall-chart.

Mrs. McFarland was at once placed in charge of the school, with Clah as an assistant, and Mrs. Sarah Dickinson, a Christian Tongass Indian, as interpreter. Early in the history of her school, Mrs. McFarland found a difficulty in holding her girl pupils. According to the customs of their people, they were frequently hired or sold by their own mothers to white traders, miners, and others for base purposes. And the brighter the girl the greater her danger; for, as she improved in the school, she began to dress more neatly, comb her hair, and keep her person more cleanly; the dull, stolid cast of countenance gave way to the light of intelligence, and she began to be more attractive, and consequently in greater demand. To save these girls necessitated the establishment of a "home" into which they could be gathered, and thus taken out from under the control of their mothers. Consequently a home was added to the school in October, 1878, and kept in what was formerly the hospital building of the military post.

In July, 1879, I made my second trip to Alaska, in company with Rev. Dr. Henry Kendall, senior secretary of the Presbyterian Board of Home Missions. We took out with us Miss Maggie J. Dunbar, to take charge of the school, while Mrs. McFarland gave her whole time to the "home," which has since been named the "McFarland Home," and has now 30 inmates, representing thirteen different tribes.

The average attendance of day pupils during the season of 1880–'81 was 60. This is now so largely increased that two additional teachers

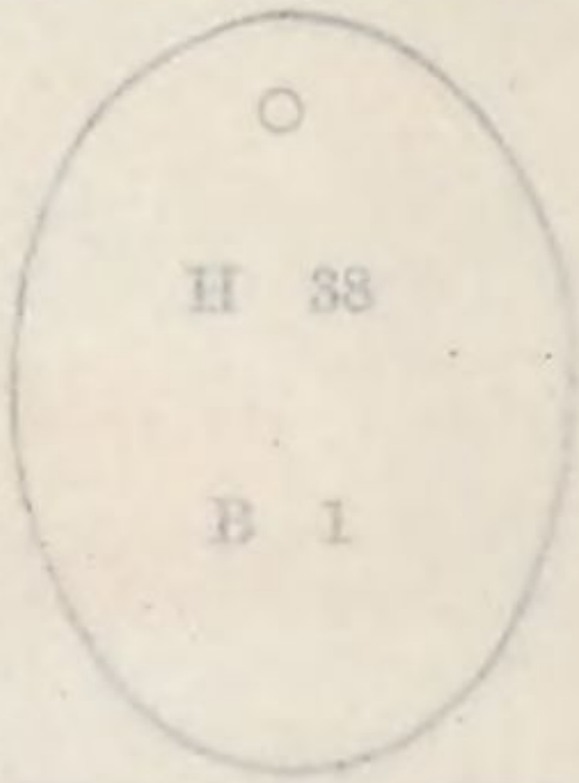
have been appointed. During the season of 1879 I provided for the erection of a large two-story building, with basement and attic, 40 by 60 feet, for the use of the home and school, which has since been completed at an expense of $7,600. In August, 1878, Rev. S. Hall Young was sent out to take charge of the mission church at Fort Wrangel. In June, 1879, Rev. W. H. R. Corlies and family reached Wrangel as volunteer teachers. Mrs. Corlies at once opened a school on the beach for the children of the visiting Indians, of whom there are sometimes as many as a thousand. These come from all parts of the coast, for the purposes of trade. They see what is being done by the teachers and carry away the leaven with them. This school on the beach has exerted a very wide influence and created a demand for schools among several of the tribes. During the long winter evenings a night school has been carried on for the adults by Messrs. Young and Corlies.

SITKA SCHOOLS.

In the winter of 1877–'78 I secured the appointment of Rev. John G. Brady for Sitka, and in April, 1878, a school was opened by Mr. Brady and Miss Fannie E. Kellogg. In December, through a combination of circumstances, it was discontinued. In the spring of 1880 Miss Olinda Austin was sent out from New York City, and reopened the school April 5, in one of the rooms of the guard-house, with 103 children present. This number increased to 130. Then some of the parents applied for admission, but could not be received, as the room would not hold any more. Miss Austin received the support and substantial assistance of Captain Beardslee, then in command of the United States ship Jamestown, who proved himself a warm friend of the enterprise. In July the school was moved to the old hospital building. In November some of the boys applied to the teacher for permission to live at the schoolhouse. At home there was so much drinking, talking, and carousing that they could not study. The teacher said she had no accommodations, bedding, or food for them. But they were so much in earnest that they said they would provide for themselves. Upon receiving permission, seven Indian boys, thirteen and fourteen years of age, bringing a blanket each and a piece of tin for a looking-glass, voluntarily left their homes and took up their abode in a vacant room of one of the government buildings. Thus commenced the boarding department of the Sitka school. Soon other boys joined them. One was a boy who had been taken out and shot as a witch, but was rescued by the officers of the Jamestown and placed in the school. Capt. Henry Glass, who succeeded Captain Beardslee in command of the Jamestown, from the first, with his officers, took a deep interest in the school. As he has had opportunity he secured boys from distant tribes and placed them in the school, until there are 27 boys in the boarding department.

In February, 1881, Captain Glass established a rule compelling the attendance of the Indian children upon the day school, which was a move in the right direction and has worked admirably. He first caused the Indian village to be cleaned up, ditches dug around each house for drainage, and the house whitewashed. These sanitary regulations have already greatly lessened the sickness and death-rate among them. He then caused the houses to be numbered, and an accurate census taken of the inmates, adults and children. He then caused a label to be made of tin for each child, which was tied around the neck of the child, with his or her number, and the number of the house on it, so that if a child was found on the street during school hours, the Indian policeman was un-

MISS O. AUSTIN AND HER CLASS OF INDIAN BOYS, "SHELDON JACKSON INSTITUTE," SITKA, ALASKA.



The Sitka school is now kept in a two-story log building that was formerly used as an hospital, but more latterly as a stable.

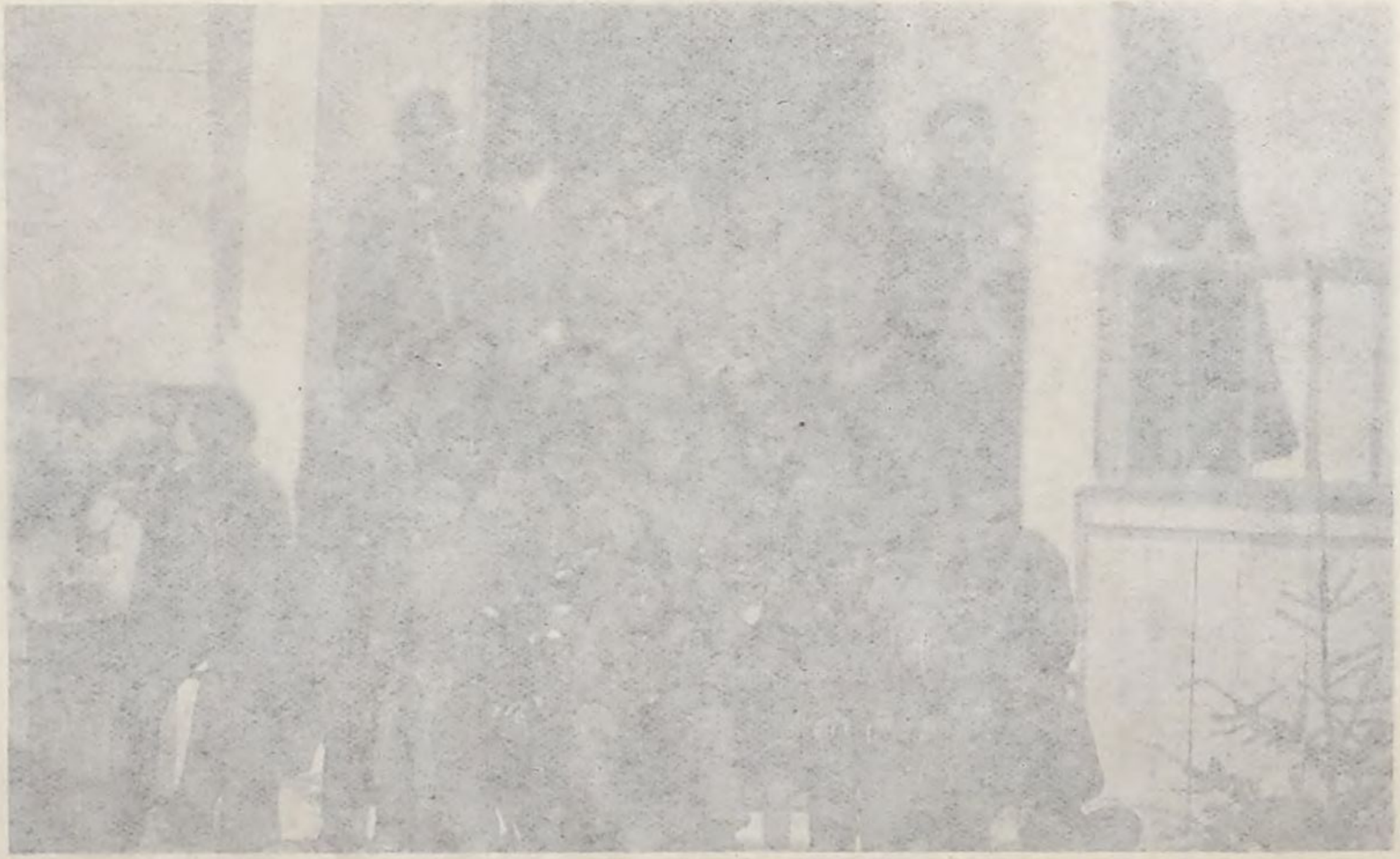
Sitka, in the height of its glory, was the headquarters of Russian supremacy in the North Pacific, the center of an extended commerce, the capital of a large province, the seat of a bishopric of the Greek Russian church, with schools and seminaries. There remains a large number of public buildings, so that at the time of the purchase by the United States of various descriptions were turned over as public property to the number than will be needed again for the government for years. These are log buildings erected seventy-five years ago, now fallen to decay of age in that damp climate and neglect, six feet posts in the ground. J. W. White, of the United States Revenue Marine, in Ex. Doc. 179, Forty-sixth Congress, second session, page 5, reported them:

> I found many windows broken, locks taken from several doors of the houses, and all the lead piping removed. The roofs generally are in a leaky condition and the property is going to ruin rapidly.

Nearly all the government buildings, with the exception of the hospital and two stables in its vicinity, are located around the parade ground. The hospital and [illegible] of a mile distant from the wharf and other buildings. Congress will be asked to turn over the industrial and boarding school, now occupying not needed by the government and are no longer poses, even if needed. They are rotting down once, will soon be beyond repairing. Further, mony with the government efforts at Indian education. The setting apart of this hospital for this school has been recommended by the several collectors of customs for the district, and Captains Beardslee and Glass, in command of the naval forces in Alaska waters.

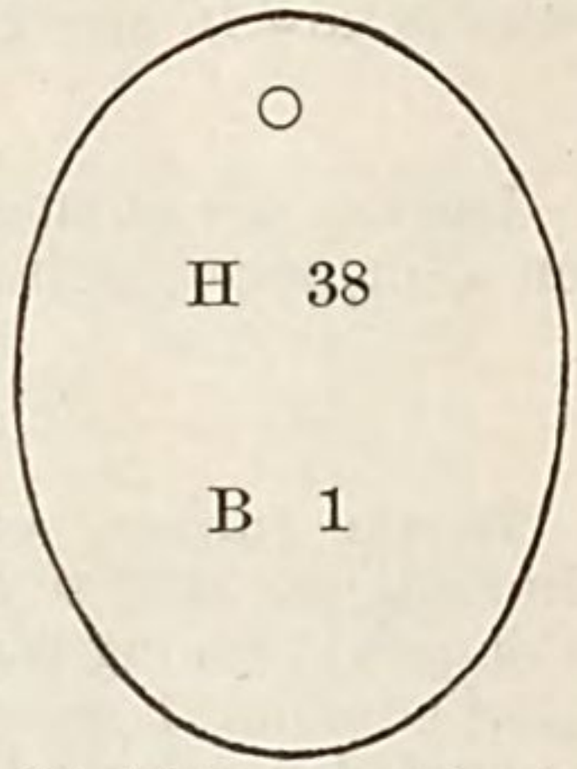
RUSSIAN SCHOOL AT SITKA.

In the fall of 1879, through a private effort made by Captain Beardslee, the officers of the United States ship Jamestown, and the citizens of Sitka, a school was opened by Alonzo E. Austin for the children of Sitka



MISS O. AUSTIN AND HER CLASS OF INDIAN BOYS, "SHELDON JACKSON INSTITUTE," SITKA, ALASKA.

der orders to take the numbers on the labels and report them, or the teacher each day would report that such numbers from such houses were absent that day. The following morning the head Indian of the house to which the absentee belonged was summoned to appear and answer for the absence of the child. If the child was wilfully absent, the headman was fined or imprisoned. A few cases of fine were sufficient. As soon as they found the captain in earnest, the children were all in school. This ran the average attendance up to 230 and 250, one day reaching, with adults, 271. In April Mr. Alonzo E. Austin was associated with his daughter in the school, and Mrs. Austin was appointed matron. A fuller account of these schools at Fort Wrangel and at Sitka, together with the Indian schools in British Columbia, is to be found in a book published by Dodd, Mead & Co., 755 Broadway, New York City—"Alaska, and Missions on the North Pacific Coast."



This label represents boy 1, in house 38.

The Sitka school is now kept in a two-story log building that was formerly used as an hospital, but more latterly as a stable.

Sitka, in the height of its glory, was the headquarters of Russian supremacy in the North Pacific, the center of an extensive commerce, the capital of a large province, the seat of a bishopric of the Greco-Russian church, with schools and seminaries. These required a large number of public buildings, so that at the time of the purchase 42 buildings of various descriptions were turned over as public property; a much larger number than will be needed again for the government service. These are log buildings erected seventy-five years ago, and, both on account of age in that damp climate and neglect, are fast going to ruin. Capt. J. W. White, of the United States Revenue Marine, in Senate Ex. Doc. 179, Forty-sixth Congress, second session, page 22, says, concerning them:

> I found many windows broken, locks taken from a number of the inside doors of several of the houses, and all the lead piping removed. The roofs of most of the houses are in a leaky condition and the property is fast going to destruction.

Nearly all the government buildings, with the exception of the hospital and two stables in its vicinity, are located near the wharf, around the parade ground. The hospital and two stables are nearly a quarter of a mile distant from the wharf and other government buildings. These buildings Congress will be asked to turn over for the use of the Indian industrial and boarding school, now occupying them. The buildings are not needed by the government and are no longer fit for hospital purposes, even if needed. They are rotting down, and, if not attended to at once, will soon be beyond repairing. Further, they are asked for in harmony with the government efforts at Indian education and civilization. The setting apart of this hospital for this school has been officially recommended by the several collectors of customs for the Alaska district, and Captains Beardslee and Glass, in command of the United States naval forces in Alaska waters.

RUSSIAN SCHOOL AT SITKA.

In the fall of 1879, through a private effort made by Captain Beardslee, the officers of the United States ship Jamestown, and the citizens of Sitka, a school was opened by Alonzo E. Austin for the white and Rus-

sian children, with an average attendance of 45 to 55. When, in the spring of 1880, Mr. Austin went into the Indian school, he was succeeded by his second daughter, who left in August to teach in an Indian school among the Hoonyahs. Miss Austin was succeeded by Mrs. Zechard, who is now in charge.

TAKOO.

During the summer of 1880, Rev. and Mrs. W. H. R. Corlies carried on a temporary school among the Takoos.

CHILCAT.

In the summer of 1880, Mrs. Sarah Dickinson, a Christian Tongass Indian, was sent to open a school at the store of the Northwest Trading Company, among the Chilcats, at the head of Lynn Channel. During the past summer I erected at that point a residence for the teachers and provided a school building, leaving Rev. E. S. Willard, of Illinois, in charge, with a flourishing school.

HOONYAH TRIBE.

During the past summer I erected a school house and residence for the teachers in the principal village of the Hoonyahs, on Cross Sound, and left Mr. and Mrs. Walter B. Styles, of New York City, in charge of the school.

HYDAH TRIBE.

At Jackson, near the southern end of Prince of Wales Island, the chief presented me with a good native house, which I altered over and repaired so that it will answer very well for a school this winter. Next season I hope to build there also. The teacher is Mr. James E. Chapman, of Ohio.

In all these schools the English language is taught. The above five schools in the Alexander Archipelago, with the small Russian schools at Ounalashka and Belkovsky, and the two schools of the Alaska Commercial Company, on the Seal Islands, comprise all the schools in Alaska, leaving a population of fully 20,000 without any educational advantages whatever.

THE VOICE OF THE NATIVES.

Among a few of the native tribes of the United States there is no wish for schools, and it is with great difficulty that the children can be persuaded to attend. But not so in Southeastern Alaska. Wherever a school has been opened it has been filled at once with children eager to learn.

In 1875 the Hon. James G. Swan was appointed a special commissioner of the Department of the Interior to visit Southeastern Alaska. In his official report to the department occur the following paragraphs:

> From Fort Simpson we proceeded to Fort Tongass, in Alaska, some 15 miles distant from Simpson. This is an abandoned military post, belonging to the United States, and now occupied by a band of 700 Tongass, under a chief named Ya-soot. He came on board and expressed a great desire to have a missionary and a teacher. He said he felt ashamed when he went to Fort Simpson to see all the children learning to read and write, and all the Indians going to church, while the Tongass Indians had neither a missionary nor teacher, and he thought that "Washington" does not take as good care of the Alaska Indians as King George (the name they give the English) does of the Indians at Fort Simpson. He wished me to ask "Washington" to send them a

state children, with an average attendance of 45 to 55. When, in the spring of 1880, Mr. Austin went into the Indian school, he was succeeded by his second daughter, who left in August to teach in an Indian school among the Haidahs. Miss Austin was succeeded by Mrs. Zeeh, and she is now in charge.

TAKOO.

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GOULCAR.

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HOONYAH INDIAN MODELING A CANOE.

missionary, and he would make his people build him a house, and he would compel all the Indians to send their children to school. Now, this apparent eagerness for a missionary is simply owing to a feeling of jealousy of the Tsimseans, who are given to boasting to the Alaska Indians that the English Government takes better care of them than the American Government does of the Alaskans. Still, a beneficial influence is exerted by the feeling; for in all my experience of over 20 years among the coast tribes, the great difficulty has been to get them to allow a missionary to reside among them. This same feeling was exhibited in every village we visited during our cruise. It was the old cry, "Come over from Macedonia and help us." I sincerely believe if this matter was placed in the hands of the various missionary societies, and they could send men like Mr. Duncan and Mr. Crosby, free and untrammeled by any of the restrictions that now necessarily surround the Indian agents under our present plan, that far more good would be effected among the natives, and at far less cost, than by our present system.

* * * * * * *

The Indians who reside at Wrangel are the Stickine tribe. Some of them have fine large houses built Indian style, but with the modern improvement of doors and windows. I conversed with several of the chiefs, and they expressed an anxious desire for schools and missionaries. [A school has since been established.]

The following day, June 18, we left Fort Wrangel for Sitka, and arrived in Sitka Harbor the next morning.

I talked with the Indians in one of their houses in the village, and they were very earnest in their entreaties that a missionary and teacher should be sent among them. It is very true there is a Greek church at Sitka, with a fine chime of bells, with silver chandeliers and candlesticks, and fine paintings, presented years ago by Catherine, Empress of all the Russias, but the present priests are Aleuts, who have no influence among the natives. The Indians told me they wanted a "Boston" (American) missionary, who would teach their children to read and write, just as the missionary does at Fort Simpson. [This mission has been established.]

The following morning we reached Koutznoo point and village, on the northeast side of Chatham Strait, east from Lindenburg Harbor. We found the village regularly laid out in streets, lanes, and alleys. The houses were surrounded with garden patches planted in rows, well heaped up to admit of drainage. Each garden was fenced in. The Indians raise most excellent potatoes at this place.

Although most of the tribe were absent on a hunt, there were quite a number present, who beset me with entreaties for a missionary and a teacher, and I promised them, as I had done the others, that I would present their case to the Indian Bureau.

At 12 m. we left Koutznoo and ran down Chatham Straits for Kake village, on the north side of Kou or Koo Island. Here we remained all night. The chief had a little boy with him, and expressed a strong desire that the child should go to school. He also asked for a teacher to be sent among them.

On the morning of the 28th we left for Kla-Wack, which consists of an Indian village and trading post. As there are quite a number of children there, and as it is in a position easily visited by the Indians from various villages, it would be a most excellent position for establishing a school, and Mr. Hamilton, the tradesman, assured me that he would do all in his power to render assistance to any teacher who should come among them. I saw some remarkably intelligent looking children, whose parents lamented that there was no school for them. It is not necessary to make treaties with the Alaska Indians or remove them to reservations. *What these Indians all ask for is to have a teacher sent to them, one to every principal Indian village, and when there is such a universal desire to have their children instructed, we may look for the happiest results.*

On the morning of the 2d day of July, 1875, we left Howkan for Klemmakoan village, on the north side of Cordoon Bay, and arrived there at 3 p. m. The chief of this village is a half-breed, named Kinowen, a celebrated silversmith, from whom I purchased some beautiful bracelets and other jewelry of silver.

This village is the largest, and has more carvings than any I have seen, but the Indians were unwilling to part with any.

Kinowen came on board the cutter with his wife and four children, and told me if the American Government would send a teacher he would let him select a place to suit him, and the Indians would build him a house and send the children to school.

On the 4th of July we arrived at Fort Tongass, which is now a deserted military post, but the residence of about 400 Tongass Indians. The chief came on board and again expressed the same views regarding a school which he did on our first visit in June, and this time Captain Scammon, through an interpreter, told him that he would do all in his power to induce the government to attend to the matter.

On the 6th day of July we ran into Karta Bay to the Indian village of Kazan. Here I purchased of a trader several beautiful specimens of bead embroidery and shawl work, and on the morning of the 7th we proceeded to Fort Wrangel, arriving there at 6.22 p. m., and remained there until the 17th. The Indians were, like all the rest, earnest in their entreaties for teachers and missionaries.

From Fort Wrangel we proceeded to Fort Tongass, where we landed some stores for the customs officer, and then proceeded to Fort Simpson, British Columbia, where we arrived at 11 a. m., on Sunday morning, July 18th. All the Indians, except some strangers from Alaska, had gone to church, and not wishing to disturb the congregation, I took a walk to see the new church which Mr. Crosby was building. As I passed the big lodge where we had the wedding feast, about a dozen Indians, men and women, came out, all well dressed. One of them had a book under his arm. I asked them if they were going to church. They said no, that they belonged to Metlakatla mission, and had been holding service after the Episcopal form taught them by Mr. Duncan. The Indian with the book under his arm told me that he was the minister; and then opening his book he handed it to me, pointing to a passage. "Read that," said he; "I can't read well; I wish I could." The book was the Bible, and the passage was the 18th and 19th verses of the 4th chapter of St. Luke. "I wish I could preach better," said he. The text was so appropriate and the serious earnestness of the whole party, together with the profound stillness of the village, made a deep impression upon me.

Just as I finished talking with this Indian minister, the congregation of Mr. Crosby's church came out; there were some five or six hundred of them, all scrupulously clean and well dressed. It was a sight I have never witnessed before, and it spoke volumes to my mind of the efficient training Mr. Crosby has given these Indians, and the wonderful change wrought in this tribe by Mr. Duncan, Episcopalian, at Metlakatla, and Mr. Crosby, at Fort Simpson.

I partook of lunch at the fort with Mr. and Mrs. Morrison. As we sat down to the table, Mrs. Morrison, a native woman, asked a blessing on our repast, and when we had finished she returned thanks in the forms common among English people, and this in a simple and devout demeanor, which showed that she really felt what she said.

I was so impressed with what I had seen that day that I could not help the thought that the people whom we dare to call savages can teach the so-called Christians lessons of humility. I left Fort Simpson with a feeling of respect for those Indians that I have never before felt for any tribe I have lived with on the Northwest coast, and I feel confident if missionaries and teachers are sent them by the various missionary societies of all denominations of Christians in the same untrammeled manner accorded to Messrs. Duncan and Crosby, that the Alaska tribes will not only stay at home and trade with our own people, but they will be morally, physically, and pecuniarily better off than they will be should our present miserable policy of Indian agencies be thrust upon them.

In the fall of 1877, a man, belonging to the Hydah tribe entered Mrs. McFarland's school, at Fort Wrangel as an A B C scholar. He said that Major-General Howard, Vincent Colyer, Major Swan, and other government officers that had visited them had promised to get the government to send them teachers, but no teachers had come, and now he would learn for himself, and then go back and teach his people.

Hos-Kox, chief of the Hoochinoos, came to Mrs. McFarland for a teacher for his tribe; laying his hand upon his heart, he said with great earnestness: "Me much sick heart. You come and teach all the Stickeens, all Hydahs, all Tongass, about God. My people all dark heart. Nobody teach them" After this chief returned to his people, they had a drunken spree which so discouraged and mortified him that he committed suicide.

In July, 1878, a committee of Indians from Kla-Wack made a strong appeal to Mrs. McFarland for a teacher. During my trip in 1879 I had conferences with prominent chiefs of the Chilcat, Hydah, and Tongass tribes, all asking for teachers. And to show their sincerity, on my recent trip, Shateritch, the head chief of the Chilcats, gave me the best house in his village for school purposes. He has also sent one of his boys to the Indian training school, Forest Grove, Oregon.

Skule-Ka, a leading chief of the Hydahs, also gave the best house in his village for a school, and his wife does the teacher's washing free of charge, saying, "he was teaching them freely, and she would wash for him in like manner."

At a council held by Lieutenant Hanus, of the United States ship Jamestown, with the Chilcats, they said that if a teacher was sent to them, "they would look up to him as they do to the sun."

SCHOOL CHILDREN IN FRONT OF CHURCH, METLAHKATLAH, BRITISH COLUMBIA.

TESTIMONY OF GOVERNMENT OFFICIALS AND TRAVELERS.

The Hon. James G. Swan, [illegible] letter to the Hon. William [illegible] 1878, says:

In 1875 I had the honor of being [illegible] States for procuring articles of Native manufacture [illegible] exhibited at the Centennial Exposition in Philadelphia, and [illegible] States revenue steamer Wolcott, in charge of [illegible] July of that year.

During that cruise we stopped at many [illegible] ever we had any conversation with the [illegible] that the government would send [illegible] sent to the Indians of British Columbia, and that particularly [illegible] at Fort Simpson, and at Metlacatlah, British Columbia, the former [illegible] of Rev. Mr. Crosby, of the Wesleyan Methodist Society of Canada, and the latter under charge of Rev. Mr. Duncan, of the Church Missionary Society of London, England.

Fort Simpson, being one of the principal trading posts of the Hudson Bay Company, and situated but a few miles from the southern [illegible] where a great many of the Alaskan tribes resort to trade, [illegible] for themselves the superior condition of the Indians [illegible] and Metlacatlah, and it was undoubtedly a great [illegible] comparison of their own uncivilized state [illegible] the Tsimseans, which caused them to [illegible] government aid in sending teachers to [illegible]

In a report made by me to the Commissioner of [illegible] was also published in the Port Townsend Argus, [illegible] on this subject, and strongly recommended that [illegible] Alaska Indians a similar policy to that [illegible] at the two missions of Metlacatlah and Fort Simpson [illegible] serve to explain the method which I would suggest [illegible] management of the Alaskan tribes.

In October, 1857, Mr. William Duncan, a [illegible] and graduate at Highbury Episcopal Training [illegible] ciety of London, was selected to fill the post of [illegible] and, with no other aid than the stipend paid him by [illegible] tions from charitable persons in England and in Victoria, [illegible] the Indians under his charge a self-sustaining [illegible] which many of our pioneer communities might [illegible]

In May, 1860, Mr. Duncan, finding the location [illegible] to his purpose, removed to his present place [illegible] where he established a town. There, acting [illegible] cian, builder, arbitrator, magistrate, trader, and [illegible] has labored so successfully that they now own a [illegible] they have a joint stock trading-house, a market [illegible] smith shop, saw-mill, and octagon-shaped school [illegible] building 90 feet by 30, used as court-house, for public [illegible] strangers; a mission-house 64 feet by 32, containing [illegible] floor, a specious dormitory above, and out-buildings [illegible] where they weave blankets and common flannel on a [illegible] proprietors of the Mission Mills at San Francisco; a [illegible] a boot and shoe factory, and a variety of other useful [illegible] particularize.

The British Government recognizes Mr. Duncan's great [illegible] cials in the navy and army, who may be on the coast of [illegible] him such aid as he may need. But there his connection [illegible] He has done this work with the voluntary aid and [illegible] is by their help rendered independent of any outside [illegible] work. There are no paid officials, no annuities, no treaties [illegible] agents, but the whole is managed just as any community [illegible] their town affairs.

After Mr. Duncan left Fort Simpson, he was succeeded by [illegible] Wesleyan Mission. What I have written of Mr. Duncan [illegible] Both these gentlemen are doing a great and marked good [illegible] and the only way in which the Dominion government of Canada [illegible] is through its efficient Indian commissioner, Dr. John W. [illegible] annually visits those missions and all the coast tribes, in the [illegible]

SCHOOL CHILDREN IN FRONT OF CHURCH, METLAHKATLAH, BRITISH COLUMBIA.

TESTIMONY OF GOVERNMENT OFFICERS AND OTHERS.

The Hon. James G. Swan, special United States commissioner, in a letter to the Hon. William Gouverneur Morris, under date of October 19, 1878, says:

In 1875 I had the honor of being appointed as a special commissioner of the United States for procuring articles of Indian manufacture for the National Museum, to be exhibited at the Centennial Exposition in Philadelphia, and proceeded, in the United States revenue steamer Wolcott, to Alaska, in a cruise during the months of June and July of that year.

During that cruise we stopped at many of the villages of various tribes, and whenever we had any conversation with the Indians it was the universally expressed wish that the government would send them teachers and missionaries, as the English had sent to the Indians of British Columbia, and they particularly referred to the missions at Fort Simpson, and at Metlacatlah, British Columbia, the former under the charge of Rev. Mr. Crosby, of the Wesleyan Methodist Society of Ontario, Canada, and the latter under charge of Rev. Mr. Duncan, of the Episcopal Missionary Society of London, England.

Fort Simpson, being one of the principal trading posts of the Hudson's Bay Company, and situated but a few miles from the southern boundary of Alaska, is the place where a great many of the Alaskan tribes resort to sell their furs, and have there seen for themselves the superior condition of the Tsimsean Indians, both at Fort Simpson and Metlacatlah, and it was undoubtedly a jealous spirit, induced by the unfavorable comparison of their own uncivilized state, in contrast with the great improvement of the Tsimseans, which caused them to be so unanimous in their applications to us for government aid in sending teachers to them.

In a report made by me to the Commissioner of Indian Affairs on my return, which was also published in the Port Townsend Argus, September 3, 1877, I dwelt at length on this subject, and strongly recommended that our government adopt toward the Alaska Indians a similar policy to that so successfully enforced in British Columbia, at the two missions of Metlacatlah and Fort Simpson, a short account of which will serve to explain the method which I would suggest our government adopt in its future management of the Alaskan tribes.

In October, 1857, Mr. William Duncan, a missionary, schoolmaster, and catechist, and graduate at Highbury Episcopal Training College of the Church Missionary Society of London, was selected to fill the post of teacher and missionary at Fort Simpson, and, with no other aid than the stipend paid him by the society and occasional donations from charitable persons in England and in Victoria, he has succeeded in making the Indians under his charge a self-sustaining people, and their settlement is a model which many of our pioneer communities might emulate with profit.

In May, 1860, Mr. Duncan, finding the locality of the post at Fort Simpson unsuited to his purpose, removed to his present place at Metlacatlah, some twenty miles south, where he established a town. Here, acting in turns as minister, schoolmaster, physician, builder, arbitrator, magistrate, trader, and teacher of various mechanic arts, he has labored so successfully that they now own a schooner trading regularly to Victoria; they have a joint stock trading-house, a market-house, a soap-manufactory, blacksmith shop, saw-mill, and octagon-shaped school-house, which cost nearly $4,000; a building 90 feet by 30, used as court-house, for public meetings, and to accommodate strangers; a mission-house 64 feet by 32, containing seven apartments on the ground floor, a specious dormitory above, and out-buildings; also a church, a woolen factory, where they weave blankets and common flannel on a machine supplied them by the proprietors of the Mission Mills at San Francisco; a rope and twine factory, a tannery, a boot and shoe factory, and a variety of other useful things impossible for me here to particularize.

The British Government recognizes Mr. Duncan's great work, and directs all its officials in the navy and army, who may be on the coast of British Columbia, to render him such aid as he may need. But there his connection with his government ends. He has done this work with the voluntary aid and contributions of the Indians, and is by their help rendered independent of any outside support to carry on the mission work. There are no paid officials, no annuities, no treaties, and no theiving Indian agents, but the whole is managed just as any community of white people manage their town affairs.

After Mr. Duncan left Fort Simpson, he was succeeded by Rev. Mr. Crosby, of the Wesleyan Mission. What I have written of Mr. Duncan can be said of Mr. Crosby. Both these gentlemen are doing a great and marked good in their respective missions, and the only way in which the Dominion government of Canada takes care of them is through its efficient Indian commissioner, Dr. John W. Powell, of Victoria, who annually visits those missions and all the coast tribes, in the Dominion steamer Sir

James Douglas, and who is ready at all times to co-operate with Messrs. Duncan and Crosby in enforcing the laws of the Dominion relative to Indian affairs.

The coast tribes of British Columbia are quite as savage as those of Alaska. They all have trade and intercourse with each other, and their manners and customs are identical, and, as the Alaskan Indians are desirous of having schools and teachers as the British Columbia Indians have, it seems to me to point out the true method by which our government can manage those natives. I am averse to all treaties and reservations. * * * We have all seen the great error and little good of that policy, but have been unable to avert or amend it. But Alaska is an exception to our Indian population. Separated from the States and Territories by British Columbia, her Indian tribes have no affinity with or knowledge of the working of our treaty system, and they present a fresh field of operation. * * *

From my own knowledge and experience and long observation, I feel justified in asserting that the Alaskan Indians are now just in that state in which they would receive teachers most cordially, and would do as much as the Tsimseans have done for the missions at Fort Simpson and Metlacatlah. This plan is no theory of mine, nor is it a new thing. It is a plan which has been in successful operation in British Columbia for many years, and is one peculiarly adapted to the Indians of Alaska; one which many of them have seen in successful operation, and one which they heartily indorse, and wish introduced among them. On the score of economy, it is eminently superior to any system we now have regarding Indian management, and, as regards benefiting the Indians in every respect, we have only to refer to the missions I alluded to for proof of its excellence. But above all things, this system is to be recommended for its freedom from change.

Dr. Baily, U. S. A., earnestly recommends schools as a curative for existing evils in Alaska:

SITKA, ALASKA TERRITORY,
October 25, 1869.

Hon. VINCENT COLYER:

MY DEAR SIR: I inclose for your information the report of Acting Assistant Surgeon John A. Tonner, U. S. A., in medical charge of the Indians in this vicinity, in conformity to instructions given him by me. A copy of the same is inclosed.

This report is instructive, and contains important suggestions, which, if carried out, would go far towards improving their condition.

These Indians are a civil and well-behaved people; they do not want bayonets to keep them in subjection, but they do want honest, faithful, and Christian workers among them; those that will care for them, teach and instruct them in useful arts, and that they are responsible beings. I look upon the different military posts in this department as disastrous and destructive to their well-being; they are not, and can never be, of the least possible use; they are only so many whiskey fonts from whence it is spread over the country. If we ever have trouble with them and become involved in war, it will be found to arise from these causes. From the nature and character of the country, posts never can render the least influence—afford protection against contraband trade; this can only be done by armed vessels, in command of choice men. To go into detail on all points would require pages; you have seen enough to satisfy yourself, and in giving you the inclosed report I only want to add my testimony against what I conceive to be a most grievous error in the management of the Indian affairs in this Territory.

When you go home, send us honest, faithful, Christian workers; *not place-seekers*, but those who want to do good work for *Christ's* sake and kingdom. Send men and women, for both are wanted.

When you can do away with the evils spoken of, and which are so evident, and adopt this latter course, then there will be hope, and not until then.

Sincerely, your friend,

E. J. BAILY,
Surgeon, U. S. A., Medical Director Department of Alaska.

The Hon. Vincent Colyer, reporting to the Commission of Indian Affairs the result of his visit to the native tribes of Alaska in 1869, urges that the government furnish them with schools and teachers.

Maj. Gen. O. O. Howard, who was in command of that military division, says:

As the military authority is now held responsible for Indian affairs in Alaska, I have thought it best to make a full statement of my observations, with the hope that speedy legislation may be had to give to our Indians there, as well as others, already said to be in advance of others in point of intelligence, certainly as good opportunities in the way of government and instruction as those have in contiguous British territory.

Charles W. Raymond, U. S. A., captain of engineers, writes from Unalashka Harbor, Alaska, October 6, 1869:

The Hudson Bay Company has ever pursued an enlightened policy with regard to the encouragement of missions among the Indians with whom they trade. I cannot refrain from expressing the hope that, while American enterprise is so rapidly developing this new country, American religion will not permit its people to relapse into their original darkness, and allow a great work so well begun to cease.

Henry C. DeAlma, collector of customs, in a report to the honorable Secretary of the Treasury, November 4, 1877 (Senate Ex. Doc. No. 194, Forty-sixth Congress, second session, page 5, says):

If the department would communicate with the Commission of Education it might lead to the desired result of giving the inhabitants of Sitka those benefits all Americans are enjoying, viz, means of education and mental improvement. As things are now, Indians and creoles are growing up like the beasts in the field.

Commander L. A. Beardslee to the Hon. Secretary of the Navy, Senate Ex. Doc. No. 105, Forty-sixth Congress, Second session, page 12:

It is my judgment that we will best serve American interests by so teaching and cultivating this race as to win their confidence and get them to recognize us as their friends, whom it is their interest to serve.

William H. Dall, esq., Smithsonian Institution, in a letter with reference to a government for Alaska, says:

Ten per cent. of the revenue of the United States from the Territory for the year preceding the current year should be applied to free schools under the Bureau of Education, by the Superintendent of Public Instruction, at the most populous centers, and the commanders of cruisers should be authorized in enlist into the Navy native Alaskans when they might show themselves suitable for the duties required.

Ex-President Hayes, in his last message to Congress, December 1, 1880, says:

The problem is to supply the Territory for a population so scattered and so peculiar in its origin and condition. The natives are reported to be tractable and self-supporting, and if properly instructed doubtless would advance rapidly in civilization, and a new factor of prosperity would be added to the national life. I therefore recommend the requisite legislation upon this subject.

President Arthur, December 6, 1881, says, in his message to Congress

I regret to state that the people of Alaska have reason to complain that they are as yet unprovided with any form of government by which life or property can be protected. While the extent of its population does not justify the application of the costly machinery of Territorial administration, there is immediate necessity for constituting such a form of government as will promote the education of the people and secure the administration of justice.

GOVERNMENT ACTION.

Russia transferred to the United States (see Diplomatic Correspond ence, 1867, Part 1, pages 404 and 405) "dock-yards, barracks, hospitals and *schools*." Also in the inventory of property turned over occurs "school-building of timber, with its appurtenances," at Sitka; "a timber building for school," at Kadiak.

In 1870, Congress, by an act approved July 1, leased the Seal Islands to the Alaska Commercial Company for a period of twenty years. In section 6 of said Act occur these words:

And the Secretary of the Treasury is hereby empowered and authorized to make al needful rules and regulations for the collection and payment of the same, for the com fort, maintenance, *education*, and protection of the natives of said islands.

In the regulations of the company for the guidance of their employés section 15 reads:

Free schools will be maintained by the company eight months in each year, four hours per day, Sundays and holidays excepted, and agents and teachers will endeavor to secure the attendance of all. The company will furnish the necessary books, stationery, and other appliances for the use of the schools without cost to the people.

In 1869, the Board of Indian Commissioners, page 109 of their report, urged that an appropriation of $100,000 be made to provide schools of instruction in the primary branches of the English language, &c.

Again, in report of Board of Indian Commissioners for 1870, page 145, renewing the request for $100,000:

This report has the approval of the board, and is now officially presented to you with the earnest prayer that it may meet with the favorable consideration of the Committee on Indian Affairs, and be by you submitted to the Senate for adoption.

Very respectfully, your obedient servant,

VINCENT COLYER.

Hon. J. D. Cox,
Secretary of the Interior.

DEPARTMENT OF THE INTERIOR,
Washington, D. C., April 22, 1870.

SIR: I have the honor to transmit herewith for your information a letter dated the 21st instant from Vincent Colyer, esq., secretary of the Board of Indian Commissioners, together with the report therein referred to in relation to the condition of the Indian tribes in Alaska, which Territory has not yet been organized in connection with the Indian service. I take great pleasure in communicating the report of the commissioners, and concur in their recommendation that the sum of $100,000 be appropriated for the benefit of the Indians in Alaska, to be expended for the objects named in the letter of Mr. Colyer.

Very respectfully, your obedient servant,

J. D. COX,
Secretary.

Hon. JAMES HARLAN,
Chairman Committee on Indian Affairs, United States Senate.

BOARD OF INDIAN COMMISSIONERS,
Pittsburgh, February 14, 1872.

DEAR SIR: I have the honor to transmit for your information a copy of a resolution adopted by the Board of Indian Commissioners at the meeting in Washington on the 13th ultimo, on the subject of Indians in Alaska; also, a letter addressed to you by Hon. Lot M. Morrill, late chairman of the Senate Committee on Appropriations, showing that it was the intention of Congress that a portion of the fund alluded to in the resolution of the board should be used for the purpose indicated among the Indians of Alaska.

The letter from Senator Morrill was procured agreeably to your suggestion, made some time ago to Mr. Colyer, that such a communication would be desirable, and the transmission of the resolution of the board has been delayed until it could be procured.

Very respectfully, your obedient servant, &c.,

FELIX R. BRUNOT,
Chairman.

Hon. C. DELANO,
Secretary of the Interior, Washington, D. C.

"*Resolved*, That the President be respectfully requested to place the Indians of Alaska under the care of the Department of the Interior, with a view to the early commencement of measures for their education and advancement in civilization; and that the board respectfully recommend that the sum estimated by the late Commissioner of Indian Affairs, and recommended by the late Secretary of the Interior, of the appropriation for educating Indians not otherwise provided for, be devoted to that purpose."

UNITED STATES SENATE CHAMBER,
Washington, February 10, 1872.

SIR: The bill making appropriation for the Indian Department, &c., for 1870–'71, was amended in the Senate by adding a proviso for the support of industrial and other schools among the Indian tribes not otherwise provided for, to be expended under the direction of the Secretary of the Interior, $100,000.

The Indian peace commission had recommended a specific appropriation for the Indians in Alaska, as also had the Secretary of the Interior. The committee preferred to make the appropriation general, leaving it to the Secretary to apply such part to Alaska Indians as in his discretion he might think best.

Very respectfully, yours,

L. M. MORRILL.

Hon. C. DELANO,
Secretary of the Interior.

DEPARTMENT OF THE INTERIOR,
Washington, D. C., March 16, 1872.

SIR: I have the honor to transmit herewith, first, copy of a letter from the Commissioner of Indian Affairs to this department, dated March 14, 1872; secondly, copy of a communication addressed to the Commissioner of Indian Affairs by William Borrows, late of the United States Army; thirdly, copy of a letter addressed to this department by Felix R. Brunot, chairman of the board of peace commissioners, dated February 14, 1872; fourthly, copy of a letter from Hon. L. M. Morrill, addressed to this department on the 10th of February, 1872.

These papers each refer to the condition of the inhabitants of Alaska who resided there prior to, and at the date of, our acquisition of that territory. The communication of Mr. Borrows gives some interesting and valuable information in reference to the numbers, character, habits, and general requirements of these people.

The letter of Commissioner Walker, referring to this subject, suggests doubts as to whether the native inhabitants of Alaska should be administratively recognized as Indians, within the intention of the laws organizing the Indian Office, prior to some positive legislation bringing them within the recognized jurisdiction of the Office of Indian Affairs.

The letter of Mr. Brunot expresses a desire that the inhabitants of Alaska be placed under the care of the Department of the Interior, and that a portion of past appropriations, placed at the general discretion of the Secretary of the Interior to benefit the Indian tribes, be expended in providing for the education of these inhabitants.

I have given this subject such consideration as the pressure of public duty has permitted. It is undoubtedly a duty which the Government of the United States cannot ignore to provide for the welfare and civilization of the inhabitants of Alaska. It is not material to this question that this people should have descended from the same ancestry, and be of the same race, as the Indians of North America now under the guardianship of this government. Though fully recognizing this duty, I cannot, as an executive officer, undertake, in the course of administration, to expend the funds of the nation in its discharge without clear warrant of law. I am, therefore, compelled to recur to some of the circumstances connected with this question which influence my mind in arriving at the conclusion which I shall present in this communication.

In the first place, let it be remembered that Congress has not yet provided any Territorial government for Alaska. In the second place, it must be borne in mind that, prior to the acquisition of Alaska, we had a well-defined and distinctly-organized system of Indian service, embracing all the Indians of the United States and applicable to such persons only. In the third place, it must be remembered that it is exceedingly doubtful whether the inhabitants of Alaska, so far at least as they inhabit the islands, belong to the same race or family of men as the Indians of North America. It may, therefore, be well doubted whether, in view of these considerations, appropriations made for the general service of the Indian Office, as known and recognized prior to the acquisition of Alaska, can, with propriety, without distinct and definite legislation authorizing it to be done, be expended in providing for the wants and subsistence of the people of Alaska. That it is the duty of the government to bring this semi-barbarous and uncivilized people under the influence of the beneficial provisions made for the Indian tribes now under the jurisdiction of the Indian Office I have no doubt, and I therefore take great pleasure in laying before Congress the information which is contained in the several papers herein referred to.

I have expressed the views contained in this communication for the purpose of inviting the attention of Congress to this subject, in order that such legislation may be introduced and perfected as will lead to the performance of the duty which the government owes to the inhabitants of Alaska, without having such result accomplished by what would be at least a very doubtful, if not a clearly erroneous, interpretation of existing laws.

Very respectfully, your obedient servant,

C. DELANO,
Secretary.

The Hon. the SPEAKER *of the House of Representatives.*

DEPARTMENT OF THE INTERIOR, OFFICE OF INDIAN AFFAIRS,
Washington, D. C., March 14, 1872.

SIR: I have the honor to acknowledge receipt, by reference from the department of the 19th ultimo, of a communication from Hon. Felix R. Brunot, chairman Board of Indian Commissioners, accompanied with a resolution adopted by that board on the 13th of January last, and a letter from Senator Morrill on the subject of Indian affairs in Alaska.

By this resolution it is proposed that the Indian tribes be placed under the care of the Department of the Interior, and that the sum of $45,000 of the appropriation "For

the support of schools not otherwise provided for" be devoted to the education and civilization of said Indians.

The Hon. L. M. Morrill states that the Indian commission, as well as the Secretary of the Interior, had recommended that a special amount be appropriated for the civilization of the Indians of Alaska, but that the Committee on Appropriations preferred to make the appropriation for support of schools, &c., general, leaving it to the Secretary to apply such part thereof to Alaska Indians as in his discretion should be deemed advisable.

Mr. Brunot's letter having been referred to this office for its views on the subject embraced therein, I am constrained to say, without disparaging the importance of early efforts for advancing in civilization the natives of Alaska, I cannot recommend the application to that purpose of any of the money appropriated by the act of July 15, 1870, for the support of manual-labor and other schools among the Indian tribes at present under the control of the department. My reasons for withholdingsuch recommendation are threefold:

1. It appears to me that the provisions of the act of July 15, 1870, in the respect mentioned, must be held to apply only to Indian tribes within the territory of the United States, exclusive of Alaska, and that the department would not be justified in extending its agencies over a people numbering fifty or sixty thousand by authority of anything contained in that act. Even were the right to do so unquestioned, I should not regard it as judicious to commit the department to a work involving the necessity of continued appropriations, and upon an increasing scale, without some distinct expression of intention and purpose of the law-making power.

2. The department has, upon the recommendation of this office, requested such a modification of the act of July 15, 1870, as will allow the balance of $93,717.91 to be applied under the direction of the Secretary of the Interior at such times, in such sums, and for such tribes and bands as in his opinion may be required in promoting education among the Indians.

If the bill which has been introduced into Congress in accordance with this recommendation should become a law, I am entirely satisfied that the balance of the appropriation remaining could be applied with much larger results of good to tribes nearer at hand, and with which the government has long sustained relations.

3. I suggest with diffidence whether it is on the whole desirable that, in advance of legislation for the organization of Alaska as a Territory of the United States, the natives of that region should be administratively recognized as Indians within the intention of the laws organizing the Indian Office.

The efforts and expenditures proposed in the communication of Mr. Brunot could hardly be expected to yield any considerable result of a positive character within the time which will probably precede the organization of some form of government for this district. But the effects of such administrative treatment might be most unfortunate, inasmuch as, if regarded as Indians, these natives must be held to be subject to a constitutional disqualification for citizenship. For myself I have never believed that the natives of Alaska were Indians within the meaning of the Constitution, any more than are Esquimaux or Kanakas, and I am disposed to avoid entirely the use of the word Indians as applied to them. The balance of probabilities seems to me to incline toward an Asiatic origin, at least so far as the inhabitants of the coast and of the islands are concerned. The inference from their geographical position, strong as it may be, is hardly so strong as the inference from their singular mimetic gifts and the high degree of mechanical dexterity which they are capable of attaining. These are qualities characteristic of the Oriental, and they are precisely the qualities in which the North American Indian is most deficient. But without attempting to establish their connection with the Chinese or Japanese, or to trace their descent from the lost tribes, it is sufficient for the purposes of this report if it be shown that the department is not concluded by any irresistible sequence to treat the natives of Alaska as Indians within the intention of the law organizing the Indian Office. That it is undesirable to do so appears to me plain. The provision of the Constitution excluding Indians from the political body is so far invidious and opposed to the general spirit of that instrument, and more especially to the spirit of the recent amendments thereto, that it should be construed strictly, not extending unnecessarily to races of a questionable ethnical type and occupying a position practically distinct and apart from the range of the undoubted Indian tribes of the continent. * * * * *

Very respectfully, your obedient servant,

F. A. WALKER,
Commissioner.

Hon. C. DELANO,
Secretary of the Interior.

BOARD OF INDIAN COMMISSIONERS,
Pittsburgh, April 4, 1872.

DEAR SIR: Some time in February, by direction of the board of Indian Commissioners, I addressed a note to the honorable Secretary of the Interior, inclosing a reso-

lution of the board, recommending that part of an existing appropriation for the education of Indians should be devoted to the establishment of schools for the natives of Alaska.

The Secretary of the Interior has not communicated further with the board on the subject, but I learn from a printed letter addressed to the Speaker of the House of Representatives, which reached me a few days ago, that both Secretary Delano and the Commissioner of Indian Affairs have some objections to the propositions of the board. I was glad to find from the letter that both the Secretary of the Interior and the Commissioner of Indian Affairs appreciate the duty and obligations of the government to the inhabitants of Alaska, and the importance of early legislation on the subject. There are but few, I think, who will deny that it is the duty of the government to care for this people; but, in view of the difficulties which surround the whole subject of our relations to the aboriginals, and the reluctance to increase expenditures, some may desire to postpone the necessary legislation.

Our board believes that in view of the process of demoralization now going on in Alaska, early counteracting measures are imperatively called for, and are in the interest of true economy. The longer a commencement of the work is postponed, the greater will be the obstacles to success and the more costly the work to be accomplished.

In the hope that yourself and your committee may have the like opinions, I venture to submit the inclosed draught of a bill embodying what seems to be the best plan for adoption under the circumstances. There is no doubt that many of the natives of Alaska are superior to the average of the American Indians. On the coast and islands they live in wooden houses (some with glass windows), having doors and interior arrangements like the cabins of ships. General Jeff. C. Davis describes the Aleutes (War Department Report, 1870, page 60) as an "honest, peaceful race of people, very nearly approaching a state of semi-civilization, which they had already acquired under great disadvantages." The Koloshians are said to be quick, shrewd, and willing to learn.

F. K. Louthan, who was three years in Alaska, says of the Sitkas: "Their village consists of fifty-six houses, well built. * * * They are industrious and ingenious, and able to imitate admirably almost anything placed before them." Of the Koloshians he says: "They are quite as intelligent and easy of culture, needing only the same system of education as the Hydas to, in a very short time, fully utilize them for every purpose of government and usefulness." Among the Hydas and Chemseans he says "can be found men and women of high culture and refinement, fit to adorn almost any position in life." The Aleutes, numbering from 4,000 to 5,000, are nearly all professing Christians of the Greek Church.

Hon. William S. Dodge, ex-mayor of Sitka (in report of Board of Indian Commissioners, 1869 page 38), says of the Aleutes: "Many of them are highly educated." * * * The administrator of the fur company often reposed great confidence in them. One of their best navigators was Aleutian; their best traders and accountants were Aleutians."

It cannot be that a race of people capable of such elevation as this shall be left to date their downward progress in demoralization, ending in final extinction, to the transfer of their country to the United States, and surely the American people will sustain Congress in any reasonable effort to prevent so disgraceful a result. Major-General Halleck, in a report to the War Department in 1869, estimated the number of Indians in Alaska at 70,000, but Mr. William H. Dall, in his work on Alaska, states the number at 27,664, including 1,421 creoles or mixed-bloods.

The tribes inhabiting the coast and islands seem to be more susceptible of education and more anxious for civilization than the interior tribes, and for this reason the words "coast and islands" are used in the proposed bill.

Permit me to refer you to the report of the Board of Indian Commissioners for 1869, where you will find much valuable information on the subject, which was collected by Mr. Colyer, who visited that country under the auspices of the board. In connection with the proposition to place the natives of Alaska in charge of the Bureau of Education, I also ask your attention to the report of the Commissioner of Education for 1870, pages 23, 25, 236, 339, 345.

Very respectfully, your obedient servant,

FELIX R. BRUNOT,
Chairman of the Board of Indian Commissioners.

Hon. J. P. C. SHANKS, M. C.,
Chairman of Committee on Indian Affairs.

P. S.—I send you with this a cameo ring, made by an Alaska Indian, as an example of their expertness in carving. They make many such things, and this one, which seems to have been imitated from English or American work, is probably quite equal to similar work among us.

A BILL to establish schools among the natives of Alaska.

Whereas, by the purchase of Alaska, the Government of the United States has become responsible for the proper care and government of the native inhabitants of that

country, many of whom are reported to be docile, peaceful, partially civilized, apt in mechanical arts, and anxious for instruction;

And whereas it is believed to be sound policy, as well as the duty of the government, to adopt prompt measures for their education and Christianization, with a view to their admission to the rights of citizenship: Therefore,

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the native inhabitants and creoles or mixed-bloods resident upon the coast and islands of Alaska be, and are hereby, placed under the management and control of the Department of the Interior, so far as may be necessary for the educational purposes contemplated by this act.

SEC. 2. That the Commissioner of Education shall be charged with the duty of establishing, under competent Christian teachers, manual-labor or other schools for the instruction of said native inhabitants in the English language, the common branches of English education, the principles of republican government, and such industrial pursuits as may seem best adapted to their circumstances.

SEC. 3. That the sum of fifty thousand dollars, or so much thereof as may be found necessary, be, and the same is hereby, appropriated to carry out the purposes of this act.

The Board of Indian Commissioners was composed of Felix R. Brunot, Pittsburgh; Robert Campbell, Saint Louis; Nathan Bishop, New York; William E. Dodge, New York; John V. Farwell, Chicago; George H. Stuart, Philadelphia; Edward S. Tobey, Boston; John D. Lang, Maine; a body of men honored and respected for their good judgment and other sterling qualities by the whole nation. For years these men pleaded for some action by which the native races of Alaska might be educated into American citizenship. In their annual report for 1872, page 18, referring to the failure to secure the benefit of an appropriation of $50,000 that was made for educational purposes in Alaska, they say:

> It was understood by the board that the act of Congress July 15, 1870, appropriating $100,000 for the support of "schools among the Indian tribes not otherwise provided for" included the sum of $50,000 which had been asked for education in Alaska.
>
> The Secretary of the Interior and Commissioner of Indian affairs did not feel authorized to apply any portion of the appropriation to Alaska for reasons given in a communication to the Hon. Speaker of the House of Representatives dated March 16, 1872. * * * * The reluctance felt on all sides to extend the operations of the Indian Bureau to Alaska, and the belief that the Aleutes and possibly other natives of that country are not Indians, is shared by the board; and to avoid the difficulty, an effort was made made, through the Committee on Indian Affairs in the House of Representatives, to procure an appropriation for educational purposes alone and place the educational interests of the native inhabitants of Alaska under the care of the United States Commissioner of Education. It is earnestly hoped that prompt and efficacious measures may be adopted to stop the process of demoralization which commenced among the Alaskians with the transfer of their country to the United States.

With this all public action with reference to education seems to have ceased, and nothing further was done until 1877. In that year I visited Alaska and established the school at Fort Wrangel. Upon my return to New York the secretaries of the Mission Board addressed the following letter to the Hon. Secretary of the Interior:

BOARD OF HOME MISSIONS,
PRESBYTERIAN MISSION HOUSE,
No. 23 Centre Street, New York, December 10, 1877.

HON. AND DEAR SIR: Last June a petition was sent us from Fort Wrangel, Alaska, pleading for a school and teachers. The plea was so urgent that Dr. Sheldon Jackson, superintendent of our mission and educational work in the Territories, visited Alaska. He found no schools in all that section, except the form of one at Wrangel, taught by an uneducated native from British Columbia. So great was the desire to learn to read and speak the English language, that even such a school averaged over 50 pupils during last winter, principally adults. Dr. Jackson at once organized a good school and left an efficient teacher in charge. Since then we have had applications from various sections of Alaska for similar schools. We are willing to do this and co-operate with your department in building up at the several central points of population industrial schools, where, in addition to the rudiments of an English education, the

men shall be taught the carpenter and other industrial pursuits, and the women sewing, cooking, housekeeping, nursing, &c. To give efficiency to this wise and humane policy of the government it would be wise to ask an appropriation of $———, to be disbursed under the direction of the Hon. Commissioner of the Bureau of Education, Department of the Interior.

Very truly, yours,

HENRY KENDALL,
CYRUS DICKSON,
Secretaries.

Report of the Hon. Commissioner of Indian Affairs for 1877, pages 26 and 27:

The Indians of Alaska, numbering over 20,000, being within the jurisdiction of the United States, have at least a moral claim upon the government for assistance in the way of civilization. * * * Under the policy of letting these tribes alone, Indians who are as yet without the influence of either the virtues or vices of civilization will gradually become victims to the practice of whisky-drinking and other deteriorating influences; those whose contact with whites has already resulted in demoralization will become still more degraded; and those who under Russian rule and influence became partially civilized will, by the withdrawal of the restraints and protection of Russian law, and the failure to substitute the authority of the United States Government, relapse into barbarism.

The fact that these tribes are not dependent on the government for subsistence, and are not occupying lands which United States citizens covet, should not serve as an argument for leaving them without law, order, or civilizing influences. Unless it is the intention of the government to abandon Alaska altogether, some plan for bringing these Indians under civilizing control of the government should be adopted at an early day, especially for furnishing them educational facilities. I would recommend the appointment of a special agent, whose duty it shall be to ascertain their condition and wants and make report thereon, to be the basis of future action.

I have the honor to be, sir, very respectfully, your obedient servant,

E. A. HAYT,
Commissioner.

HON. SECRETARY OF THE INTERIOR.

And again in the annual report of the Commissioner of Indian Affairs for 1880, page vii:

The attention of Congress has been repeatedly called to the necessity of making some provision for the education of the Alaska Indians, but thus far no action has been taken on the matter. * * * A comparatively small expenditure in that direction could, in this slow but sure way, be made of incalculable ultimate benefit to the Alaska Indians.

At the ninth annual conference (January, 1880), page 96 of annual report, 1879:

Resolved, That this convention earnestly request the honorable Secretary of the Interior to make an appropriation for educational purposes in Alaska, that they may share with other Indians in educational privileges.

On the 15th of October, 1879, the following letter was addressed to the honorable Secretary of the Interior, in reply to his request for a report of the situation:

BOARD OF HOME MISSIONS OF THE PRESBYTERIAN CHURCH,
MISSION HOUSE, 23 CENTRE STREET,
New York, October 15, 1879.

DEAR SIR: Having returned from a special visit to the native tribes in Southeastern Alaska, we take pleasure in complying with your request of last winter that we should send you some report of our impressions. We visited Sitka, Fort Wrangel, the coast along Prince Frederick Sound, and up the Stickeen River, also Tongass and the British schools at Fort Simpson and Metlakatla. We also saw representatives of several other tribes visiting at Fort Wrangel. We were agreeably surprised at the progress those people have made in civilization as compared with the Indians of Colorado, Wyoming, and Dakota. We found them industrious and easily governed. We found them serving as deck hands, pilots, and cooks on the small river steamers that ply on the Stickeen. They manifested an eagerness to learn and improve their condition in life that is very commendable and ought to be encouraged.

From Dixon's Inlet on the south for 300 to 400 miles along the coast to the head of Lynn Channel the several tribes, with but one exception, speak a common tongue, the Thlinket, which will be of great advantage in any effort to establish schools. The exception spoken of is the Hydah tribe, that have a language of their own. The Tongass and Hydah, in the south, number about 1,200; the Stickeens, about 1,000; the Kakes and Kous, about 568; the Awks, 640; the Takoos, 500 or 600; Chilcats, 1,000; Hootchenoos, 666; Hoonyahs, about 1,000; Sitkians, 721, with scattered ones making about 7,000 speaking the Thlinket tongue. We have already established schools at Fort Wrangel and Sitka and are arranging to establish schools among the Chilcats and Hydahs. These schools could be greatly enlarged and extended if the government would aid in the same way that it is doing among the Indian schools of the Territories. The few thousand dollars judiciously spent now in giving that people an elementary education and instruction in the industries will save hundreds of thousands of dollars in future wars. We found a very strong desire among the natives we met for the establishment of schools among their several tribes.

Knowing your great zeal to elevate the masses and free the oppressed and lift our common humanity to a higher plane of intelligence and comfort, we confidently look to you to take such action as in your judgment will secure Congressional aid in the school work among the native races of Alaska.

Very respectfully, yours,

HENRY KENDALL.
SHELDON JACKSON.

Hon. CARL SCHURZ,
Secretary of the Interior.

DEPARTMENT OF THE INTERIOR, OFFICE OF THE SECRETARY,
Washington, December 1, 1879.

DEAR SIRS: I received your letter concerning the success of your mission in Alaska. I am very much obliged to you for the information you give me and glad to learn that you have been able to do so much good.

This department would with pleasure extend a helping hand to your endeavors for the education of the Indians there, had it any funds at its disposal or any authority at law for doing so. But both these indispensable things are wanting. It might perhaps be proper that you should apply to Congress in the way of petition for an appropriation in aid of the efforts to educate the Alaska Indians.

Very truly, yours,

C. SCHURZ.

H. KENDALL, Esq.,
SHELDON JACKSON, Esq.

Acting upon the suggestion of the honorable Secretary, a meeting was called in New York City of the friends of education in Alaska, to confer and agree on some line of action to secure the co-operation of the general government. This meeting was held in January, 1880, and resulted in the presentation to Congress of the following paper:

A memorial to the honorable Senate and House of Representatives of the United States of America in Congress assembled.

Whereas the United States is responsible for the proper care and government of Alaska, the native inhabitants of which and creoles of mixed blood are docile, peaceful, partially civilized, apt in the mechanical arts, and anxious for instruction;

And whereas it is believed to be the wise policy as well as duty of the government to adopt prompt measures for their education with a view to their admission to the rights of citizenship;

And whereas it is both cheaper and more humane to give them educational facilities now than to fight them hereafter at a largely increased cost;

And whereas they are a self-supporting people, needing no annuities, clothing, or rations from the government, but do need teachers, which they cannot procure for themselves;

And whereas the government receives an annual revenue from Alaska of $317,500, and only returns to that country in the form of salaries of United States officers, pay of monthly mail steamer, support of steam revenue-cutter, &c., the sum of about $65,000, leaving a net revenue of over $250,000:

Therefore we, the undersigned, citizens of the United States, do hereby memorialize your honorable body to appropriate from the revenue of Alaska in the Treasury the sum of $50,000, or so much thereof as may be necessary to be expended by the Commissioner of Education, under the direction of the honorable Secretary of the Interior, for the establishment under competent teachers of schools for the instruction of the

native population and creoles of Alaska in the English language, the common branches of an English education, the principles of a republican government, and such industrial pursuits as may seem best adapted to their circumstances.

With great respect, yours, truly,

SHELDON JACKSON,
Superintendent of Presbyterian Schools in the Territories.
JNO. LANAHAN,
Pastor Foundry Methodist Episcopal Church.

WASHINGTON, D. C., *Febrnary* 2, 1880.

The Hon. James A. Garfield presented the memorial in the House of Representatives and moved its reference to the Committee on Appropriations.

On the 2d of February, 1880, Hon. Senator Dawes presented it to the S ate, saying:

I present a petition signed by Rev. Sheldon Jackson, superintendent of the Presbyterian schools in the Territories. and Rev. John Lanahan, pastor of the Foundry Methodist Episcopal Church, in Washington City, in which they represent to Congress that the Territory of Alaska, when purchased by the United States, had a system of education maintained by the Russian Government; that upon our taking control of that Territory the whole system expired, and the entire Territory has been left without any means of education; that the present generation is growing up in ignorance and relapsing into barbarism; that the United States is receiving into its Treasury from the Territory every year $317,500, more than 4 per cent. interest upon the original purchase; that it pays back for the benefit of the Territory only $65,000 of this sum, and they pray that out of the $250,000 net revenue received into the Treasury every year from Alaska, $50,000 of it may be appropriated for some system of education to those people whom we have obligated ourselves to Russia to provide for in the treaty of purchase. I move that the petition be referred to the Committee on Appropriations, and I commend it to their careful consideration.

The motion was agreed to.

On the 5th of February the memorial was reported back to the Senate by the chairman of the Committee on Appropriations, with the request that it should be referred to the Committee on Education and Labor, which was done.

At the request of the Hon. James E. Bailey, chairman of the Senate Committee on Education and Labor, the following memorandum was submitted:

WASHINGTON, D. C., *March* 15, 1880.

HON. AND DEAR SIR: Almost constant traveling since I met you in the committee-room has prevented an earlier compliance with your request that I should write out a memorandum of the principal points with reference to the petition for an appropriation for educational facilities for Alaska. The memorial itself embodies some of the reasons why the government should grant this petition and why it is proper and just that you should report a bill to that effect. Also see the remarks of Senator Dawes on the presentation of the memorial. The presentation of Senator Dawes and the memorial present their own reasons why Congress should make the appropriation.

In addition permit me to say that Congress, with the warmest approval of the best portion of American citizens, has for years past recognized its duty to provide education for Indian youths, but up to this time has never recognized its duty to the native inhabitants of Alaska.

This memorial asks that they be granted the same privileges as the native tribes of Dakota, Montana, or other Territories, with this difference: The appropriations for schools among the Dakota, Montana, and other Indians are administered through the Indian Bureau.

In the case of the Alaska natives it is proposed to administer through the Educational Bureau of the Department of the Interior, for the following reasons:

1st. Among the Dakota, Montana, and other Indians, the work of the government is a mixed one. It not only educates, but to some extent feeds, clothes, and issues annuities. But with the Alaskans there are no treaties or annuities needed. It is purely and solely an educational work, and as such more properly comes under that branch of the government.

2d. There will be fewer complications and greater freedom of execution under the Educational than the Indian Bureau.

Again, if good schools can be established among those natives before the advent of many whites, they will be better prepared to resist the temptations of whisky that come into frontier countries with the first traders.

In 1870 Congress appropriated $50,000 for education in Alaska, but on account of doubts as to authority to administer, it was never used for that purpose. See Annual Report of Board of Indian Commissioners for 1872, pages 132, 134 (which is also copied into this report). We now ask that a similar sum be reappropriated.

Further, the appropriation asked for is but a small portion of the revenue of that section, and surely it is not an unreasonable request that a portion of the revenue of that country should be used by the government in advancing their civilization and comfort.

Perhaps the following form would meet all the requirements of the case.

For the prevention of future wars, for the honor of our nation, for the cause of humanity, for the elevating influence of the Gospel that will follow government schools, I would ask you to use your high position and great influence in pushing the following or some similar bill through the Senate.

With great respect, I remain, very truly, yours,

SHELDON JACKSON.

Hon. JAMES E. BAILEY,
Chairman of Senate Committee on Education and Labor.

A copy of the memorandum furnished the Hon. James E. Bailey was also sent to the Hon. A. E. Burnside, in response to the following letter:

SENATE CHAMBER, *Washington, March* 16, 1880.

DEAR SIR: Will you kindly send me any pamphlets or circular you may have published touching the condition of affairs in Alaska. I am interested in having a system of education established there.

Very truly yours.

A. E. BURNSIDE,
United States Senator.

Dr. SHELDON JACKSON
Superintendent, &c.

Population of Alaska, from report of Ivan Petroff, special agent of the Tenth Census.

Settlements.	Whites.		Creoles.		Aleuts.		Totals.
	Male.	Female.	Male.	Female.	Male.	Female.	
Attoo	1	.....	15	17	39	35	107
Atkha (Naza)	2	.....	6	8	106	114	236
Oumnak (Nickolsky)	2	.....	4	4	59	58	127
Iliuliuk (Oonalashka)	14	.....	80	82	126	104	406
Makushin	1	.....	13	17	12	19	62
Koshigin	1	.....	.....	.....	31	42	74
Chernovsky	3	.....	1	3	45	49	101
Borka	1	.....	3	3	65	68	140
Akutan	2	.....	.....	.....	33	30	65
Akoon	1	.....	.....	.....	25	29	55
Avatanok	.....	.....	.....	.....	8	11	19
	28		122	134	549	559	1,392
Belkovsky	9	2	39	50	82	86	268
Nickolaievsky	.....	.....	.....	.....	22	21	43
Portassov (Morshevoi)	2	.....	12	9	41	36	100
Vosnessensky	1	.....	.....	.....	8	13	22
Ounga	15	.....	30	39	46	55	185
Korovinsky	.....	.....	26	18	.....	.....	44
Pirate Cove	7	.....	.....	.....	.....	.....	7
	34	2	107	116	199	211	669

Population of Alaska, from report of Ivan Petroff, &c.—Continued.

Settlements.	Whites.		Aleuts.		Total.
	Males.	Females.	Males.	Females.	
Prybilov group:					
Saint Paul	13	1	128	156	298
Saint George	4	.....	35	53	92
	17	1	163	209	390

Villages.	Whites.		Creoles.		Kodiak Innuits.		Total.
	Males.	Females.	Males.	Females.	Males.	Females.	
Saint Paul Harbor	19	1	124	129	6	9	288
Wood or Liessnoi Island	2	.....	24	32	54	45	157
Yelovoi or Spruce Island	.....	.....	40	38	.....	.....	78
Oozinkie	.....	.....	20	25	.....	.....	45
Afognak	.....	.....	104	91	76	68	339
Ooganak North	.....	.....	.....	.....	20	21	41
Ooganak South	.....	.....	.....	.....	17	15	32
Ooiak	.....	.....	.....	.....	36	40	76
Karluk	.....	.....	12	12	139	138	301
Akhiok	.....	.....	.....	.....	66	48	114
Ayakhtalik	.....	.....	2	2	48	49	101
Kaguiak	1	.....	3	6	67	64	141
Three Saints Bay	.....	.....	13	10	109	87	219
Orlovsk	.....	.....	10	7	123	138	278
Mitrofania	.....	.....	10	12	.....	.....	22
Kaluiak	.....	.....	1	.....	19	10	30
Sutkhoom	.....	.....	.....	.....	12	13	25
Kuyukak	.....	.....	.....	.....	10	8	18
Katmai	.....	.....	19	18	94	87	218
Kukak	.....	.....	.....	.....	20	17	37
Douglas	.....	.....	2	4	22	18	46
	22	1	384	386	838	875	2,006

Villages.	Whites.		Creoles.		Kodiak Innuits.		Kenaitze.		Total.
	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	
Alexandrovsk	1	.....	4	4	13	17	.....	.....	39
Seldovia	2	.....	1	2	38	30	.....	.....	73
Laida	.....	.....	.....	.....	.....	.....	40	38	78
Niniltchik	.....	.....	16	14	.....	.....	.....	.....	30
Kassilov	.....	.....	.....	.....	.....	.....	30	29	59
Chinila	.....	.....	.....	.....	.....	.....	7	8	15
Chkituk	.....	.....	2	3	.....	.....	38	30	73
Kenai Station	2	.....	1	7	.....	.....	.....	.....	10
Skilakh	.....	.....	.....	.....	.....	.....	48	52	100
Nikishka	.....	.....	.....	.....	.....	.....	37	31	68
Kinnik	2	.....	.....	.....	.....	.....	138	116	256
Sushetno	.....	.....	.....	.....	.....	.....	78	68	146
Toyonok	2	.....	3	7	.....	.....	12	13	37
	9		27	37	51	47	428	385	984

Population of Bristol Bay District.

Villages.	Whites.		Creoles.		Bristol Bay Innuits.		Togiak Innuits.		Aleuts.		Total.
	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	
Ikkhagmute	.....	.....	.....	.....	90	72	.....	.....	.....	.....	162
Paugwik (2 villages)	.....	.....	.....	.....	101	91	.....	.....	.....	.....	192
Igagik	.....	.....	.....	.....	56	62	.....	.....	.....	.....	118
Oogashik	.....	.....	.....	.....	.....	.....	.....	.....	130	115	245
Oonangashik	.....	.....	.....	.....	.....	.....	.....	.....	20	17	37
Mashikh	.....	.....	.....	.....	.....	.....	.....	.....	22	18	40
Koggiung	.....	.....	.....	.....	14	15	.....	.....	.....	.....	29
Kaskinakh	.....	.....	.....	.....	68	51	.....	.....	.....	.....	119
Chikak	.....	.....	.....	.....	25	26	.....	.....	.....	.....	51
Iliamna	.....	.....	.....	.....	29	20	.....	.....	.....	.....	49
Kichik	.....	.....	.....	.....	51	40	.....	.....	.....	.....	91
Ekuk	.....	.....	.....	.....	57	55	.....	.....	.....	.....	112
Nushegak	1	.....	50	36	42	49	.....	.....	.....	.....	178
Anagnak	.....	.....	.....	.....	48	39	.....	.....	.....	.....	87
Kanulik	.....	.....	.....	.....	76	66	.....	.....	.....	.....	142
Kakuak	.....	.....	.....	.....	54	50	.....	.....	.....	.....	104
Akulwikchuk	.....	.....	.....	.....	35	37	.....	.....	.....	.....	72
Agivivak	.....	.....	.....	.....	27	25	.....	.....	.....	.....	52
Kalignak	.....	.....	.....	.....	50	41	.....	.....	.....	.....	91
Moltchatna	.....	.....	.....	.....	92	88	.....	.....	.....	.....	180
Kuliukhpak	.....	.....	.....	.....	45	38	.....	.....	.....	.....	83
Vuikhtuligmute	.....	.....	.....	.....	27	24	.....	.....	.....	.....	51
Igushek	.....	.....	.....	.....	39	35	.....	.....	.....	.....	74
Kulluk	.....	.....	.....	.....	35	30	.....	.....	.....	.....	65
Ooallikh	.....	.....	.....	.....	37	31	.....	.....	.....	.....	68
Togiak Station	.....	.....	1	3	7	9	.....	.....	2	.....	22
Togiagamute	.....	.....	.....	.....	.....	.....	131	145	.....	.....	276
Ikaliukha	.....	.....	.....	.....	.....	.....	101	91	.....	.....	192
Tunniakhpuk	.....	.....	.....	.....	.....	.....	71	66	.....	.....	137
Kassianmute	.....	.....	.....	.....	.....	.....	299	316	.....	.....	615
Nulatok	.....	.....	.....	.....	.....	.....	108	103	.....	.....	211
Kissaïakh	.....	.....	.....	.....	.....	.....	96	85	.....	.....	181
Anoogamok	.....	.....	.....	.....	.....	.....	109	105	.....	.....	214
Total	1	.....	51	39	1,105	994	915	911	174	150	4,340

Populatiou of Kuskokvim Division.

Settlements.	Kuskokvim Innuits.	Ingalik tribes.	White.	Total.
Tzahavagamute	48	.....	.....	48
Mumtrahamute	162	.....	.....	162
Kl-changamute	18	.....	.....	18
Takiketagamute	21	.....	.....	21
Aguliagamute	120	.....	.....	120
Quinehahamute	83	.....	.....	83
Shineyagamute	40	.....	.....	40
Kuskokvagamute	24	.....	.....	24
Iliutagamute	40	.....	.....	40
Chimiagamute	71	.....	.....	71
Apokagamute	94	.....	.....	94
Kik-khwigagamute	9	.....	.....	9
Shovenagamute	58	.....	.....	58
Kakhuiyagamute	8	.....	.....	8
Akooligamute	162	.....	.....	162
Naghaïkhlawigamute	193	.....	.....	193
Taghiaratzoriamute	52	.....	.....	52
Lomawigamute	81	.....	.....	81
Napahayagamute	98	.....	.....	98
Napaskiagamute	196	.....	.....	196
Mumtrekhlagamute village	41	.....	.....	41
Mumtrekhlagamute station	29	.....	.....	29
Kooigamute	215	.....	.....	215
Kulj-khlugamute	75	.....	.....	75
Kik-khtagamute	232	.....	.....	232
Paimute	30	.....	.....	30
Akkiagamute	175	.....	.....	175
Tuluksak	150	.....	.....	150
Kwigalogamute	314	.....	.....	314

Population of Kuskokvim Division—Continued.

Settlements.	Kuskokvim Innuits.	Ingalik tribes.	White.	Total.
A single house	10	.....	.....	10
Tookhlagamute	92	.....	.....	92
A single house	10	.....	.....	10
Oogowigamute	206	.....	.....	206
Kaltkhagamute	106	.....	.....	106
Okhogamute	127	.....	.....	127
Toolooka-anahamute	59	.....	.....	59
Kokhlokhtokhpagamute	51	.....	.....	51
Kolmakovsky Redoute	5	2	2	9
Roaming Koltchanes	.....	35	.....	35
Napaimute	.....	60	.....	60
Village at headwaters	.....	50	.....	50
	3,505	147	2	3,654

Population of Yukon Delta and coast extending to right bank of Lower Kuskokvim.

	Innuits.		Innuits.
Pikmiktalik	10	Kaliookhlogamute	30
Pastoliakh	80	Kashigalagamute	10
Kigikhtawik	20	Nulakhtolagamute	25
Kotlik	8	Agiukchugamute	35
Fetkina Barabara	30	Chichinagamute	6
Village, name unknown	6	Chalitmute	60
Ingechuk	8	Anogogmute	75
Kashutuk	18	Kongiganagamute	175
Chefokhlagamute, three villages	15	Koolwagawigamute	10
Chefokhlagamute	5	Kinagamute	60
Chefokhlagamute	6	Village, name unknown	15
Igiagagamute	10	Kwigathlogamute	30
Askinak	175	Nunochogmute	40
Kashunok	125	Nauwogalokhlagamute	100
Kaialigamute	100	Villages on Big Lake	166
Ookagamute	25	Yukon Delta, between Pastolik and Cape Romantzov	300
Oonakagomute	20	Small places in interior	200
Tanunak	8		
		Total	2,006

Population of Yukon or Kvikhpak Innuits from Uphoon Mouth to Anwik.

Settlements.	Innuits.	Creoles.	Whites.	Total.
Komarov Odinotchka	12	1	.....	13
Alexeiev Odinotchka	15	1	.....	16
Eliseiev's Barabara	20	.....	.....	20
Chatinakh	40	.....	.....	40
Andreievsky Rédoute	12	2	1	15
Stari-kwikhpak village	90	.....	.....	90
Razboinikskaia village	151	.....	.....	151
Ooglovia village	102	.....	.....	102
Ingahamé	63	.....	.....	63
Single house	10	.....	.....	10
Staraia Selenie	55	.....	.....	55
Ikogmute	143	5	.....	148
John's Station	35	1	1	37
Ruibnaia	40	.....	.....	40
Pogoreshapka	121	.....	.....	121
Single house	9	.....	.....	9
Paimute	89	.....	.....	89
Askhomute	30	.....	.....	30
Ignokhatskamute	175	.....	.....	175
Makeymute	121	.....	.....	121
Total	1,333	10	2	1,345

NORTON SOUND.

Oonalakleet	100
Igawik	6
Tup-hamikwa	10
Shaktolik	60
Oonadhtolik	15
Head of Norton Bay (scattered)	20
Ogowinanagak	20
Kwikh	30
Nubviakhchugaluk	30
At-nuk	20
Ignituk	100
Chiookuk	15
Tup-ka-ak	15
Okpiktolik	12
Imokhtegokhshuk	30
Chitnashuak	20
Ayacheruk	60
Oo-innakhtagowik	10
Small village opposite Sledge Island	10
Aziak (Sledge Island)	50
Total	633

The number of Eskimos from King's Island eastward to Point Barrow on the Arctic coast has been procured from careful count and estimates of Capt. E. E. Smith, who served as ice-pilot on the United States steamer Thomas Corwin, during her Arctic cruise last summer. He reports 32 settlements, as follows:

Okuvagamute (King's Island)	100
Nook (Cape Douglas)	36
Kaviazagamute (Lake Imorook)	200
Siniogamute (Port Clarence)	36
Cape York	24
Kingigamute (Cape Prince of Wales)	400
Inalit (East Diomede Island)	40
Village opposite; name unknown	18
Ta-apkuk (Cape Espenburg)	42
Kugalukmute	12
Kongigamute (Buckland River)	90
Selawigamute (Selawik Lake)	100
Kikiktagamute (Kotzebue Sound)	200
Sheshalegamute (Kotzebue Sound)	100
Tikizat	75
An-iyakh	25
Cape Sepping	50
Ip-Not	40
Takirak	276
Cape Dyer	15
Cape Lisburne	13
Point Lay	30
Otok-kok (Icy Cape)	50
Kolumatourok	45
Noona-agamute	74
Ootaiowik	55
Binoshuragin	29
Ootiwakh	225
Refuge Inlet	40
Kokmullit (Point Barrow)	200
Colville River	50
In the Interior:	
Koo-agamutes	250
Noatagamutes	400
Killaïmutes	150
Total	2,990

P O L A R S E A

Wrangell I.
Herald I.
Icy Cape
Point Barrow
Cape Lisburne
Point Hope
EASTERN SIBERIA
East Cape
Cape Prince of Wales
BERING STRAIT
Anadyr R.
St. Lawrence I.
St. Michaels
YUKON RIVER
Ft. Macpherson
Rampart House
Ft. Yukon
Mackenzie River
Old Ft. Simpson
St. Mathew I.
Nunivak I.
Kuskokwim R.
Kenai
Mt. St. Elias
Yakutat Bay
Haines
Wilard
Harrisburg
Hoonyah
Stikine River
Sitka
Ft. Wrangell
Shakan
Jackson
Port Simpson
Metla-katla
Massett
Queen Charlotte Ids.
Ft. Rupert
VANCOUVER I.
FUCA STRAIT
Port Townsend
COLUMBIA R.
Bristol Bay
Kadiak I.
Pribiloff Ids.
Unalashka
Shumagin Ids.
Belkofski
Attu I.
Atka I.
ALEUTIAN ISLANDS
BERING SEA

Sketch Map of

ALASKA

Furnished by the U.S. Coast and Geodetic Survey

To accompany Report on Education in Alaska

By Rev. Sheldon Jackson, D.D.

1881

170° 180° 170° 160° 150° 140° 130°

70° 65° 60° 55° 50°

SEN. EX. DOC. No. 30, 1st SESS., 47th CONG.

On the Yukon River.

Settlements.	Whites.	Indians.
Anvik	1	94
Single house	.....	20
Do	.....	12
Do	.....	15
Novaia	.....	52
Single house	.....	15
Tanakhotkhaik	.....	62
Single house	.....	20
Chageluk settlements	.....	150
Khatnotontye	.....	115
Kaiakak	.....	724
Kaltag	.....	45
Nulato	3	163
Koyukuk River	.....	150
Terentief's Barabara	.....	15
Big Mountain	.....	100
Single house	.....	10
Sakatalan	.....	25
Yukatat	.....	6
Melozikakat	.....	30
Mentokakat	.....	20
Soonkakat	.....	12
Medvednaia	.....	15
Nowikakat	1	106
Kozma's Barabara	.....	11
Nuklukayet	2	27
Village above ramparts	.....	100
Fort Yukon	2	107
Gens de Large	.....	120
Tennanah River	1	700
Koltehanes, roving between Yukon or Kuskokoim	.....	75
	10	2, 226

On the Yukon River, above the fort of the same name, we know of the following people trading with Americans at Fort Reliance, who may be on British soil.

	Indians.
Charley's people	48
Foutlin or David's people	106
Fort Reliance (one white)	82
Total	236

1—POPULATION.

Divisions.	Whites.	Creoles.	Aleuts.	Innuits.							Indians.	Total.
				Kodiak.	Togiak.	Bristol Bay.	Kuskokvim.	Yukon.	Bering Sea.	Arctic.		
Yukon division	28	10	.....	.....	.....	.....	.....	3, 339	633	2, 990	.....	7, 000
Interior division	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2, 226	2, 226
Kuskokvim division	2	.....	.....	.....	.....	.....	3, 505	.....	.....	.....	147	3, 654
Bristol Bay division	1	90	324	.....	1, 826	2, 099	.....	.....	.....	.....	.....	4, 340
Kadiak parish	23	770	.....	1, 798	.....	.....	.....	.....	.....	.....	15	2, 606
Kenai mission	9	46	.....	98	.....	.....	.....	.....	.....	.....	813	984
Belkovsky parish	36	223	410	.....	.....	.....	.....	.....	.....	.....	.....	669
Oonalashka parish	28	256	1, 108	.....	.....	.....	.....	.....	.....	.....	.....	1, 392
Pribylov Islands	18	.....	372	.....	.....	.....	.....	.....	.....	.....	.....	390
Saint Lawrence Island (estimated)	.....	.....	.....	.....	.....	.....	.....	.....	400	.....	.....	400
Nunivak Island (estimated)	.....	.....	.....	.....	.....	.....	.....	.....	500	.....	.....	500
Total west of Prince William Sound	145	1, 413	2, 214	1, 896	1, 826	2, 099	3, 505	3, 339	1, 533	2, 990	3, 201	24, 161
Estimate of Prince William Sound	.....	.....	.....	300	.....	.....	.....	.....	.....	.....	200	500
Southeastern Alaska	247	270	.....	.....	.....	.....	.....	.....	.....	.....	5, 000	5, 517
Grand total	392	1, 683	2, 214	2, 196	1, 826	2, 099	3, 505	3, 339	1, 533	2, 990	8, 401	30, 178

A copy of a proposed bill.

A BILL to provide educational advantages for Alaska.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the sum of one hundred thousand dollars or so much thereof as may be necessary, be, and hereby is, appropriated from the revenues of Alaska in the Treasury not otherwise appropriated, to be expended by the Commissioner of Education, under the direction of the honorable Secretary of the Interior, for the establishment of schools at such points in that Territory as may be designated by the Secretary.

All of which, with inclosed map and views, is respectfully submitted.

Very truly, yours,

SHELDON JACKSON.

Hon. JOHN EATON,
Commissioner Bureau of Education.

47TH CONGRESS, 1st Session. } SENATE. { EX. DOC. No. 31.

MESSAGE

FROM THE

PRESIDENT OF THE UNITED STATES,

TRANSMITTING

A letter from the Secretary of the Treasury, in response to Senate resolution of December 6, 1881, concerning instructions to and reports of certain examiners of national banks, &c.

DECEMBER 21, 1881.—Read, and referred to the Committee on Finance and ordered to be printed.

To the Senate of the United States:

I transmit herewith, in response to a resolution of the Senate of the 6th instant, a letter from the Secretary of the Treasury and its accompanying papers.

CHESTER A. ARTHUR.

EXECUTIVE MANSION,
December 21, 1881.

To the President:

SIR: I have the honor to transmit to you herewith a letter of the Comptroller of the Currency and 53 inclosures referred to therein, and respectfully request that they may be forwarded by you to the Senate of the United States, in answer to its resolution requesting the same from me.

I am, sir, yours, with great respect,

CHAS. J. FOLGER,
Secretary, &c.

TREASURY DEPARTMENT,
Washington, December 20, 1881.

TREASURY DEPARTMENT,
OFFICE OF COMPTROLLER OF THE CURRENCY,
Washington, December 9, 1881.

SIR: I have the honor to acknowledge the receipt, by reference from your office, of a resolution of the Senate of the United States, directing the Secretary of the Treasury "to furnish to the Senate copies of general or special instructions issued for the guidance of persons appointed to examine and report upon the condition of national banks;

also, copies of all reports made by such examiners of all examinations of the following-named national banks made within two years prior to the failure thereof, and the reports of the condition of said banks made by the receivers subsequent to the failure of each bank, respectively, to wit: National Bank of the State of Missouri; German-American National Bank, Washington, District of Columbia; First National Bank of Newark, N. J.; Mechanics' National Bank, Newark, N. J.; and whether any national bank has been permitted to reduce the amount of its bonds on deposit for circulation below the limit of $50,000, fixed by section 4 of the act of June 20, 1874; and, also, whether the articles of association of any national bank have been extended, and under what authority of law, if any, such extension has been made."

1. *Instructions to examiners.*—I transmit herewith copies of instructions to examiners, issued by Hon. Hugh McCulloch, Comptroller of the Currency, on September 15, 1864; by S. T. Howard, Deputy Comptroller, on May 17, 1865; and by Hon. Freeman Clarke, Comptroller of the Currency, on June 22, 1865.

On August 22, 1867, circular letters were also issued by my predecessor, giving general and specific instructions to examiners, and soon after the revision of the Statutes of the United States these instructions were revised and substantially reissued by the present Comptroller, in the following form:

TREASURY DEPARTMENT,
OFFICE OF COMPTROLLER OF THE CURRENCY,
———, ———, ——.

SIR: In order that you may fully understand what information should be obtained in examining national banks, I will mention some of the points of which particular and thorough investigation should be made.

EXAMINATION OF BANKS.

The examination of a bank should not end with merely taking off and stating the balances from its books, but should also include as searching an inquiry as possible into the character of its business, the standing and fitness for their positions of the persons, including the directors, to whom the management of the affairs of the association is intrusted, the manner in which its business is usually conducted, whether prudently or otherwise; in short, should include all the information which can be obtained tending to give a correct idea of the extent to which a bank is useful in facilitating the transaction of business by lending money and discounting paper for legitimate business purposes.

OVERDRAFTS.

When it is found that overdrafts have been allowed, it should be ascertained whether such is the regular practice, and, if so, to what extent, the reasons for allowing such overdrafts, the length of time they are usually allowed to stand before the accounts are required to be made good, and whether security is required for accommodations of this kind.

PRIVATE BANKS AND BANKERS.

If the balance due from private bankers and banks not organized under the national-bank act are exceptionally large, it should be ascertained whether such balances arise in the regular course of business, and, if not, what is the occasion of them.

REAL ESTATE HELD AS AN ASSET.

If real estate held as an asset of the bank is property other than its banking-house, it should be stated what it is, how it came into the possession of the bank, whether it is held in accordance with the provisions of section 5137 of the United States Revised Statutes (paragraph 16 of the national-bank act), whether it is worth as much as the amount for which it is valued among the assets, and, if not, what the probable value of it is.

EXPENSES, PREMIUMS, CASH ITEMS.

It should be ascertained and stated whether the expenses are in proportion to the amount of business carried on, how the premium account is made up, when premiums appear among the assets, whether the cash items are legitimate, and, if not, of what nature they are, and in what way they can best be reduced or disposed of.

INTEREST ON DEPOSITS—DEPOSITS.

It should be ascertained and stated whether interest is paid on deposits, and, if so, at what rates and under what circumstances; whether all deposits received are payable on demand, and, if not, what proportion is not so payable, and the conditions on which they are taken.

REDISCOUNTS AND BILLS PAYABLE.

If it is found that the rediscount of notes has been procured, or the books of a bank show liabilities for bills payable, the necessity of procuring funds by either of these means should be inquired into and reported upon, and it should be stated whether the bank is in the habit of borrowing money.

RECORDS, OTHER BOOKS, AND ACCOUNTS.

The condition in which records and other books and accounts are found, the manner in which they are kept, and whether or not they are sufficient for the purpose, should be set forth, and any changes necessary to enable an examiner to obtain a clear understanding of the state of the bank at any time should be suggested.

OFFICERS AND DIRECTORS.

The character and standing of all officers and directors should be ascertained, if possible, and the officer to whom the chief management of the business is intrusted should be designated, in order that any letter from me in relation to the manner of doing business, or pointing out any violation of law reported, may be addressed to the person most likely to have the evils corrected.

PAST-DUE PAPER, AND BAD DEBTS.

If it is found that any portion of the loan is past due, it should be ascertained why the notes are not paid at maturity, what their condition is at the time of examination, and what the prospect of the early settlement of the paper may be; and if any part of the past-due paper is "bad debt" as defined by section 5204 of the United States Revised Statutes (paragraph 82 of the national bank act) it should be stated what security, if any, is held for it, how much of it will probably be lost, and any other information relative to its ultimate settlement which can be obtained.

PAPER UNSECURED OR PAYABLE ON DEMAND; MONEY BORROWED BY DIRECTORS.

The character of all unsecured paper, and of such as is payable on demand, should be stated, and when directors have borrowed money from their own bank to any large amount, the necessity for such accommodation should be made plain, for directors are usually supposed to be in a position to render the use, by them, of any considerable portion of the funds of their bank unnecessary.

REAL ESTATE HELD AS SECURITY.

All paper, the security for which is based upon real estate, in any form, should be clearly and fully explained, in order that it may be known whether such security was taken and is held in accordance with the provisions of section 5137 of the United States Revised Statutes (paragraph 16, of the bank act).

LAWFUL MONEY RESERVE.

When the lawful money reserve of a bank is found to be less than the amount required by section 5191 of the United States Revised Statutes (paragraph 69 of the act), it should be ascertained whether it is usually too little, or if the deficiency is exceptional, and, if so, what gave rise to it, and how such deficiencies can best be avoided.

EXCESSIVE ACCOMMODATIONS.

When it is found that the liabilities to a bank of any person, company, corporation, or firm, for money borrowed, including in the liabilities of the company or firm the liabilities of the several members thereof, exceed one-tenth of the capital of the bank, in violation of the provisions of section 5200 of the United States Revised Statutes (paragraph 78 of the act), it should be ascertained whether such excessive accommodations are habitually granted, and, if not, under what circumstances the violation of law occurred.

RESERVE; EXTENT OF ACCOMMODATIONS, &C.

All information relative to the customary state of reserve, extent of accommodations, &c., should be obtained by examining the periodical or daily statements of resources and liabilities for some time previous to the examination, and not solely by making inquiries from bank officers, which, though probably less trouble, is not in all cases as reliable a method of obtaining the information as the one indicated.

RECORDS.

The records should be examined to determine whether the organization papers, proceedings at meetings of stockholders for the election of directors, transactions at the regular meetings of the board of directors, &c., are duly recorded in proper and permanent form, and, whenever it is found necessary, the importance and necessity of having such records as will show the organization of the bank to have been made in due form, and, elections for directors held in a legal manner, and all discounts, dividends, and other matters relating to the government of the affairs of the association to have been made or carried out in accordance with the orders of the directors, and in short, of having such records as give a full and complete history of the bank and all its transactions, should be pointed out to the proper officers.

BOOKS FOR ACCOUNTS.

It should be seen whether the books for accounts also are sufficient, and in good form, and especially whether accounts are so kept that accurate reports of the condition of the bank at any past day can be made promptly when called for.

REPORTS.

The information necessary to a clear understanding of the condition of the bank should be reported as concisely as possible, and reports should be forwarded to this office as soon after examinations are made as practicable.

SUGGESTIONS TO MANAGING OFFICERS.

All violations of law developed in the course of examinations should be pointed out in a courteous manner to the managing officers, and any improvements in books and the method of keeping accounts which would add to the safety and efficiency of the conduct of the business should be suggested in such a way as will best secure their adoption.

Very respectfully,

JOHN JAY KNOX,
Comptroller.

———— — ————, Esq.,
National Bank Examiner.

On July 31, 1880, soon after the failure of the First National Bank of Newark, a circular was issued, calling special attention of all examiners "to the importance of proving the correctness of the accounts of the banks you examine with their corresponding banks and to this end you are instructed to call for, examine critically, and as far as possible reconcile accounts-current in all cases, or if it be found impossible to reconcile the accounts, as it probably often will be, you will satisfy yourself that the balances claimed, both debit and credit, are substantially correct, the means of doing which must be left to your own judgment.

"When balances claimed are exceptionally large, or if you see any reason to doubt that they are correct, you will verify them by corresponding with the debtor or creditor banks, as the case may require."

These instructions were repeated in the month of November of the present year.

2. *Reports of examiners and receivers.*—I also transmit herewith copies of the reports of the examiners of the National Bank of the State of Missouri, of the German-American National Bank of Washington, and the First National Bank of Newark, and the Mechanics' National Bank of Newark, for the two years previous to the dates of their suspension; and also the statement of the receivers of all of these banks from the dates of their failure to the present time, with the exception of that of the Mechanics' National Bank of Newark, which has not yet been received.

The various schedules connected with the receiver's reports of each of these banks, containing as they do a list of the bills receivable, and other assets of the bank, together with the names of the depositors, and the amount of each of their claims, are very voluminous, and the receivers are required to make reports four times each year.

It has been found impossible to prepare copies of these schedules in time to transmit them to Congress previous to its contemplated recess. Many of these schedules contain information in reference to the affairs of private individuals, which should not be made public. Upon your suggestion, therefore, copies of the reports are transmitted, with the suggestion that the schedules can hereafter be furnished for the inspection of any committee, or copies thereof transmitted, if it shall be so ordered.

On March 9, 1877, more than three months before the failure of the National Bank of the State of Missouri, having received unfavorable information as to its condition, and having reason to suppose that the previous examinations were not properly conducted, I directed William P. Watson, national-bank examiner in Chicago, to "visit Saint Louis and make a very particular and thorough examination of the affairs of The National Bank of the State of Missouri in that city." He was directed to examine "particularly with reference to the present value of the stock of the bank," and to obtain through appropriate channels such information as will enable him to give a reliable expression of opinion on that point.

The Chicago examiner, after careful inquiry, transmitted to me a full report relating to the assets, liabilities, and condition of the bank, estimating that there was a deficiency of at least 40 per cent. in its capital stock; informing me that the last report that had been transmitted from the bank was incorrect as to the amount of the past-due paper and character of the cash items; and also that two of the directors had loans in the bank in excess of one-tenth of its capital. Soon after receiving the examiner's report, the president of the bank visited Washington, and stated that it was almost impossible for a stranger to ascertain the value of the stocks and bonds of the miscellaneous securities, and insisted that the bank examiner had been misled in his estimates of the assets of the bank, and that the deficiency was much less than that stated by him.

It appearing, also, upon inquiry, and from information received by me, that no meeting for the election of directors had been held for the preceding year, the Comptroller at once required that an election should be held, and that newspapers should be forwarded to him containing advertisements calling for a meeting of the shareholders for that purpose, and the result of this election was a reorganization of the board of directors.

A long communication of more than ten pages was addressed to the board of directors on March 31, 1877, giving them full information in reference to the condition of the bank, as reported by the examiner. The new members of the board, one of whom was Hon. John B. Henderson, an Ex-Senator of the United States, were thus put on inquiry, and in June following, after weeks of searching investigation into the condition of the bank, they informed me that the bank was insolvent, and on the 23d of that month I appointed as receiver of the bank Mr. Walter S. Johnston, who had previously had much experience in closing up the affairs of insolvent banks. The management of affairs by the receiver has been vigorous and successful since his appointment. Dividends have been paid amounting to 95 per cent. of the claims proved against the bank, and more than $1,806,091.65 in cash has been distributed to the creditors. Another small dividend will be made to the creditors of the bank, but it is not expected that the entire amount of principal and interest will be realized from the assets.

The German-American Savings Bank was a bank organized under the

general incorporation act of the District of Columbia (Stat. at Large, vol. 16, pp. 102 and 103). Section 6 of the act of June 30, 1876, provided that "all savings or other banks now organized or which shall hereafter be organized in the District of Columbia, under any act of Congress, which shall have capital stock paid up in whole or in part, shall be subject to all the provisions of the Revised Statutes and of all acts of Congress applicable to national banking associations, so far as the same may be applicable to such savings or other banks; provided that such savings-banks now established shall not be required to have a paid-in capital exceeding one hundred thousand dollars." Under this section the German-American Savings Bank availed itself of the provisions of section 5154 of the Revised Statutes of the United States and converted into a national bank, with a paid-in capital stock of $130,000.

The loans of the bank had been largely made upon real estate, and, though apparently good, were not properly secured and except for the special legislation of Congress authorizing the conversion of savings-banks in this city, the bank would not have been organized as a national bank with so large an amount of real-estate security. The authority for conversion and articles of association were dated May 7, 1887; the payment of capital was certified May 9, and on May 14 authority to commence business was granted by the Acting Comptroller of the Currency. After its conversion into a national bank it was twice examined, once on April 18, 1878, and again on October 30 of the same year. On the strength of this latter report, which exhibited a large impairment of capital, the bank was on November 1, 1878, placed in the hands of a receiver. Copies of the examiner's reports are inclosed, together with a copy of the Comptroller's letter to the bank of May 1, 1878, and the reply thereto of June 24 next succeeding. On November 15 the receiver made a preliminary estimate of the assets and liabilities of the bank, and on January 1, 1879, made his first quarterly report. Reports have since been made quarterly by the receiver on January 1, April 1, July 1, and October 1, of each year. Copies of these reports, eleven in all, ending with October 1, 1881, are inclosed herewith. This bank has already paid $75,123.33 to the creditors, amounting to 40 per cent. of the amount of their claims, and the claims entitled to dividends have been reduced by offsets and sales of real estate from $279,248.26 to $104,207.38. It is estimated by the receiver that the bank will eventually pay from 80 to 100 per cent. to its creditors.

It will be seen by reference to the report on September 30, 1881, of the receiver of the First National Bank of Newark that he has collected in cash from the assets $555,954.79, and that dividends have been declared in favor of the creditors of 90 per cent., and it is believed that the creditors will ultimately receive dividends of 100 per cent. upon their claims, with interest.

Accompanying the last report of the examination of the Mechanics' National Bank of Newark are copies of two letters of the examiner, explaining the method by which the cashier, who has since been indicted upon criminal charges, deceived the examiner in the verification of the New York balance during his examination of the year previous.

3. *Reduction of United States bonds by national banks.*—From the date of the passage of the act of June 20, 1874, until the month of March, 1880, the usual practice of the office of the Treasurer of the United States, and of the Comptroller of the Currency, permitted national banks to deposit legal-tender notes in amounts of $9,000 and take up $10,000 of the bonds on deposit as security for circulation, as provided by the act of June 20, 1874.

During the month of March of last year the Treasurer declined to allow any bank this privilege if the bonds were thereby reduced to less than one-third of its capital stock, and upon the request of the Comptroller the question was referred by the Secretary of the Treasury to the Attorney-General, who, on April 30, 1880, decided that any national bank may be permitted to reduce its bonds on deposit to an amount not less than $50,000.

Section 5167 of the Revised Statutes provides that the Comptroller "may direct the return of any bonds to an association which transferred the same in sums of not less than $1,000, upon the surrender to him and the cancellation of a proportionate amount of such circulating notes; and up to the time of the decision of the Attorney-General it was considered within the spirit of the law to allow banks having less than $150,000 capital to reduce the amount of bonds on deposit to not less than $30,000 and not less than one-third of the capital stock paid in" (see section 5159 Revised Statutes); and under this construction both the Comptroller and the Treasurer of the United States permitted thirteen national banks to reduce their bonds to an amount equal to one-third of their capital by depositing legal-tender notes, as may be seen from the following table:

TABLE A.—*Statement showing the national banks that have reduced their bonds below* $50,000 *under the act of June* 20, 1874, *their capital stock, bonds reduced from, the United States bonds now on deposit, outstanding circulation, and the legal-tender notes on deposit with the Treasurer of the United States.*

No.	Titles.	Capital stock.	United States bonds reduced from.	United States bonds now on deposit.	Outstanding circulation.	Legal-tender notes.
1544	National Exchange Bank of Albion, Mich	$50, 000	$50, 000	$34, 000	$30, 600	
1690	First National Bank of Austin, Minn.....	50, 000	50, 000	30, 000	27, 000	
568	First National Bank of Berwick, Penn.....	75, 000	75, 000	30, 000	27, 000	
2114	First National Bank of Fayetteville, Tenn.....	60, 000	56, 000	46, 000	41, 400	$5, 155
1974	First National Bank of Fremont, Nebr	50, 000	50, 000	34, 000	30, 600	
168	First National Bank of Hillsdale, Mich	50, 000	50, 000	30, 000	27, 000	
1644	First National Bank of Houston, Texas.....	100, 000	100, 000	35, 000	31, 500	
1793	First National Bank of Kankakee, Ills.....	50, 000	50, 000	30, 000	27, 000	
1682	State National Bank of Raleigh, N. C.....	100, 000	100, 100	44, 000	39, 600	15, 345
1824	Farmers' National Bank of Salem, Va.....	50, 000	50, 000	30, 000	27, 000	
2104	First National Bank of Santa Barbara, Cal.....	100, 000	100, 000	34, 000	30, 600	15, 000
1823	First National Bank of South Haven, Mich.....	50, 000	50, 000	30, 000	27, 000	
1674	Kearsarge National Bank of Warner, N. H.....	50, 000	50, 000	35, 000	31, 500	

From this table it appears that all of these banks, with the exception of three, have now reduced their outstanding circulation by redemption to the amount authorized by the section just quoted, leaving three banks only, viz, The First National Bank of Fayetteville, Tenn.; The State National Bank of Raleigh, N. C.; and The First National Bank of Santa Barbara, Cal., which have an excess of circulation beyond that protected by bonds equal in amount to one-third of their respective capitals, such excess being, respectively, $5,555, $15,375, and $15,000, all of which is covered by deposit of legal-tender notes with the Treasurer for the amount of the excess.

Since the decision of the Attorney-General, no national bank having a capital less than $150,000 has been allowed to retire its bonds below $50,000, except upon the return of its circulating notes as provided in section 5167 of the Revised Statutes.

4. *Extension of the corporate existence of the national banks.*—No national banks have had their periods of succession extended by any amendment of their articles of association, nor has any national bank ever extended the time of its corporate existence granted in the original papers in any way. In the early history of the office there were instances in which national banks having gone into liquidation and closed up their affairs, and other national banks were organized bearing the same titles as those held by the banks in liquidation. Two of these instances are as follows: The First National Bank of Norwich, Conn., No. 65, was organized under Hon. Hugh McCulloch, Comptroller of the Currency, in 1863. The articles of association and organization certificate were dated June 1, 1863. This bank had a paid-in capital of $100,000, and deposited bonds on which circulation was issued. The certificate of the Comptroller to commence business was dated August 18, 1863. The act of February 25, 1863, did not provide for banks going into voluntary liquidation, but on May 2, 1864, the stockholders unanimously voted to close up the bank, and were permitted to do so on the return of certificate of authority authorizing them to commence business. On the day following notice of liquidation a new association was organized with the same name, to wit, The First National Bank of Norwich, but with a different number (458). Authority to commence business was granted by Hon. Hugh McCulloch, then Comptroller of the Currency, on June 16, 1864.

The First National Bank of Utica, N. Y., No. 120, was organized under the provisions of the act of February 25, 1863. Articles of association and organization certificate bear date November 6 of that year. Certificate of payment of one-third of capital, viz, $30,000, was made on that date, and on November 9 authority to commence business was granted by Hon. Hugh McCulloch, then Comptroller of the Currency. The paid-in capital stock of this bank was in due course increased to $90,000, and bonds, amounting to $30,000, deposited, on which $20,000 in circulation was issued. In the mean time, the act of June 3, 1864, superseding that of February 25, 1863, was passed. Under sections 5220, 5221, and 5222 of this act, banks could go into voluntary liquidation by vote of stockholders owning two-thirds of the stock, and on June 9, 1865, the stockholders of this bank voted to liquidate and close its affairs, and the original authority to commence business was returned to this office August 28, 1865.

On June 9, 1865, the same date of the vote to go into liquidation, the Bank of Utica, a bank doing business under the laws of the State of New York, complied with the provisions of section 44 of the act of June 3, 1864, and converted into a national bank, under the name of The First National Bank of Utica. The authority to convert was dated May 5, 1865, and the articles of association, organization certificate, and certificate of payment of capital stock, amounting to $600,000, were all dated June 9, 1865. Authority to commence business was granted by the Hon. Freeman Clarke, then Comptroller of the Currency.

The foregoing instances, among others, are cited as precedents for the more recent action of this office in the following cases:

The First National Bank of Rondout, N. Y., went into voluntary liquidation by vote of shareholders on October 11, 1880. After going into liquidation as a national bank, it organized as a bank under the laws of the State of New York, and subsequently made application, under section 5154 of the Revised Statutes, for conversion into a national bank. The organization certificate was dated October 15, 1880, and it was authorized to commence business on October 18, 1880.

Two other banks, viz, The First National Bank of Huntington, Ind.,

and The First National Bank of Indianapolis, Ind., went into voluntary liquidation under the provisions of sections 5220, 5221, and 5222 of the Revised Statutes of the United States, the former on January 31, 1881, and the latter on September 1, 1881. On February 1, 1881, articles of association were entered into to organize a new bank under the general provisions of the Revised Statutes [sections 5133 to 5141, inclusive, and 5168, 5169, and 5170], by the name of The First National Bank of Huntington. The capital stock of this bank was to be $100,000. Certificate of the payment of one-half of this sum, as required by law, was made on February 2, 1881. The authority to commence business was granted on March 3, 1881. The remainder of the full capital of $100,000 had been paid September 4, 1881.

On July 7, 1881, articles of association were entered into, under the general provisions of the Revised Statutes of the United States, to organize a new bank, with the name of The First National Bank of Indianapolis. Certificate of payment of the full capital stock to the amount of $400,000 was received on August 16, 1881. Authority to commence business was granted on September 1, 1881.

These new banks bear the names of two banks, which had ceased to exist by going into liquidation, but they are entirely distinct and different banks, with new organization numbers, and entirely new papers throughout.

On January 26, 1881, as may be seen from his printed interview with the Finance Committee of the Senate (page 46), the Comptroller said, in answer to a question by Senator Beck:

> It is impossible for the banks to go into liquidation without depositing in the Treasury legal tenders equal to the amount of their circulating notes. There is nothing in the law to prevent any national bank from going into liquidation at any time. There is nothing in the law to prevent any private persons from organizing a bank. If the national banks now in operation should see fit to go into liquidation they could do so, and thereafter the same stockholders could associate themselves together again and organize another national bank.

And in his recent report to Congress, on page 11, the subject was again fully referred to as follows:

> If, for any reason, the legislation [recommended in reference to the extension of the corporate existence of national banks] herein proposed shall not be favorably considered by Congress, the banks can still, under the present laws, renew their existence if they so desire; and, in the absence of prohibitory legislation, many of them undoubtedly will, on the expiration of their present charters, organize new associations, with nearly the same stockholders as before, and will then apply for and obtain from the Comptroller certificates authorizing them to continue business for twenty years from the respective dates of their new organization certificates. Such a course of procedure will be perfectly legal, and, indeed, under the existing laws, the Comptroller has no discretionary power in the matter, but must necessarily sanction the organization, or reorganization, of such associations as shall have conformed in all respects to the legal requirements.

Very respectfully,

JNO. JAY KNOX,
Comptroller of the Currency.

Hon. CHAS. J. FOLGER,
Secretary of the Treasury.

[Inclosure No. 1.]

TREASURY DEPARTMENT,
OFFICE OF COMPTROLLER OF THE CURRENCY,
Washington, September 15, 1864.

CHARLES CALLENDER, Esq., *Examiner:*

Herewith you have a list of banks you are to examine. For a summary, in part, of your duties, I refer you to the printed instructions of this office entitled "Instructions

and suggestions of the Comptroller." You will examine into the condition of the business of each bank, taking an account of its cash, bills, notes, United States stocks, and other assets, and compare them with their items on the general ledger.

You will report me as often as convenient the condition of the bank, and at once, if you should discover anything improper in the proceedings.

You will bear in mind that your mission is a confidential one, and that while you will talk freely with the managers of the banks in regard to the condition of the banks, not a word in respect to that condition is to be said to outsiders.

You will keep a correct account of your expenses, in order that they may be settled under the rules of the department, and make report of the same, so that the proper assessments may be made upon the banks to pay the expense of examination.

H. McCULLOCH,
Comptroller of the Currency.

List of banks to be examined by Charles Callender.

First National Bank of Sing Sing, N. Y.
First National Bank of Tarrytown, N. Y.
First National Bank of Fishkill Landing, N. Y.
First National Bank of Kingston, N. Y.
First National Bank of Newburgh, N. Y.
First National Bank of Hudson, N. Y.
First National Bank of Poughkeepsie, N. Y.

No. 8.]

TREASURY DEPARTMENT,
OFFICE OF COMPTROLLER OF THE CURRENCY,
Washington, July 7, 1863.

INSTRUCTIONS.

For the instruction and guidance of those who may desire to form banking associations under the act entitled "An act to provide a national currency, secured by a pledge of United States stocks, and to provide for the circulation and redemption thereof," approved February 25, 1863, the following information is given:

1st. The corporate names of the associations will be national banks, and they will be designated as *The* First, Second, Third, &c., National Bank of the place in which they may be located. Even when there is but one in a particular town, and no prospect of another, it will still be designated as the First National Bank, omitting the State as part of the name.

2d. On the preliminary or organization certificate a five-cent stamp is required. The original articles of association must be stamped with a five-cent stamp for each sheet of paper used, and the copies of the articles to be sent to this office must show that the originals have been legally stamped, and must be certified to as being true copies by some officer of the association. The certificate and oath required by the tenth section of the act must be stamped, each requiring a five-cent stamp, one stamp to be attached to the certificate and the other to the oath. Every oath requires a five-cent stamp.

3d. It is important that organization or preliminary certificates of the association should be carefully prepared and executed; that the names of the stockholders should be written in full; and that there should be no erasures or interlineations therein. It will be borne in mind that these certificates are not *subscription papers;* and while the parties to them must sign them with their own hands and acknowledge them in person, it is not necessary, nor exactly proper, for them to enter their own names in their hands in the fourth article.

The right of a partner to seal and acknowledge for a copartner is at least questionable. It is therefore important, if partners unite in the preliminary certificate for the organization of a national bank, that they should sign, seal, and acknowledge the same individually, and not as copartners. It is also desirable that the same rule should be observed in the articles of association.

4th. Before a certificate is given by the Comptroller authorizing an association organized under the act to commence the business of banking according to the provisions of the tenth section of the act, the following requirements of the act must have been complied with:

1st. A copy of the articles of association must have been forwarded to the Comptroller, and also a statement and oath contemplated by the ninth section and the oaths of directors required by the thirty-ninth section.

2d. United States interest-bearing bonds to an amount equal to not less than one-third of the capital stock paid in, must have been transferred and delivered to the Treasurer of the United States.

5th. The United States bonds held by the national banks, and that part of their

capital invested in these bonds, are, it is understood, exempt from national and State taxation. For the amount of national tax to which they will be subject on their circulation and on their profits, and for license, reference is made to the laws of Congress relating to the internal revenue.

The nineteenth section of the act, as far as the amount of taxation is regarded, is superseded by the seventh section of an act to provide ways and means for the support of the government, approved March 3, 1863.

6th. Circulating notes, of the highest style of engraving and printed on the best quality of paper, will be furnished to the national banks, at the expense of the government, under the provisions of the act, at the earliest day practicable, and in the order in which the banks are organized. These notes will first be supplied to the associations organized under the act; and inasmuch as serious doubts seem to be entertained in regard to the power of Congress to enlarge or increase the privileges of corporations created by State authority, it may be deemed best to have these doubts removed by the opinion of the Attorney-General, or the decision of a competent court, before the national currency is furnished to existing State banks under the sixty-second section of the act.

7th. The act provides that the preliminary certificate, with a copy of the articles of association which shall have been adopted, shall be forwarded to the Comptroller, &c. This would seem to indicate that these instruments should bear date about the same time, and, as near as may be, be concurrent acts.

8th. Section 11 of the act seems to require that the articles of association should limit or fix the time for which the association is to continue.

9th. On the certificate of each bond (coupon or registered) to be deposited with the Treasurer as the basis of the national currency to be issued thereon, there must be written or printed (to be signed by the president or cashier of the association depositing the same) substantially the following words:

"This bond is deposited with the Treasurer of the United States by the (here insert the No.) National Bank at (here insert the name of the place) in trust for said bank, and to secure the redemption and payment of the notes delivered to said bank, under the act of Congress entitled 'An act to provide a national currency secured, by a pledge of United States stocks, and to provide for the circulation and redemption thereof,' approved February 25, 1863."

When registered bonds are deposited, they must be *issued to the Treasurer of the United States, in trust for the bank depositing the same.*

It is desirable that no bond of a less denomination than $1,000 should be offered for deposit.

A description of the bonds thus deposited will be entered upon the books of the Treasurer, and on the books of the Comptroller, and the bonds will be kept in the fire-proof vaults of the Treasury.

With these precautions on the part of the national banks and the proper officers of the government, it is difficult to conceive of any contingency by which any loss or injury can result to the owners of bonds by reason of their having been deposited with the Treasurer.

10th. Except in special cases, which, in the judgment of the Comptroller, may render an actual examination necessary, the statement, under oath, of the president or cashier and a majority of the directors of the respective national banks, setting forth the place of residence of the directors, and the amount of stock held and owned by each, the amount of capital actually paid in, and the fact that the requirements of the act have been fully and in good faith complied with, will be considered sufficient evidence to entitle the associations to commence the business of banking, and on the receipt of such statement the Comptroller will give to the associations, respectively, the certificate contemplated by the tenth section of the act.

11th. Whenever a new director or directors are elected, the oath taken and subscribed by him or them, and duly certified, must be forwarded to the Comptroller, according to the requirements of section 39 of the act.

12th. Before *circulating notes* will be delivered to any bank organized under the national general banking law, the Comptroller must have satisfactory evidence, by the report of an examiner, or otherwise—

1st. That the bank is located in some city, town, or village, which is easily accessible, and not in some out-of-the-way, inaccessible place, selected for the purpose of making the return of its notes difficult and expensive.

2d. That the bank is provided with a suitable banking-room or banking-rooms, unconnected with any other business, and also with a vault, or safe, for the safe-keeping of its funds.

3d. That the bank has procured such books as may be required for the transaction of a regular banking business, one of said books to be a record or minute book, in which shall have been recorded its articles of association, copies of which shall have been forwarded to this department, and in which the proceedings of the board of directors shall be entered and preserved.

4th. That the bank shall have adopted by-laws for the management of its business, approved by the Comptroller.

5th. That the amount of its capital stock required to be paid in has been so paid, and that the same remains in bank, in cash, or with some safe depositary, subject to sight check, or has been invested in United States bonds, or in some other satisfactory manner.

6th. That the bank has in its employment competent officers for the transaction of its business; that the directors are men of fair standing, and that the bank has been organized to carry on legitimate banking.

The Comptroller will afford every aid and encouragement in his power to banks organized for the purpose of carrying into effect the spirit and intention of the law, but will discountenance and prevent, as far as practicable, all attempts to pervert the law from its proper object by establishing banks upon fictitious capital, which, by their inability to meet promptly their engagements, may, at any time, bring the system into disrepute.

NOTE.—Under the late act of Congress, all communications addressed to this department must be prepaid.

[Inclosure No. 2.]

TREASURY DEPARTMENT,
OFFICE OF THE COMPTROLLER OF THE CURRENCY,
Washington, May 17, 1865.

DEAR SIR: Your letter of the 9th instant is received. For a summary in part of your duties, I refer you to the printed instructions of this office, entitled "Instructions and Suggestions of the Comptroller," a copy of which, together with the national currency act, and the recent amendment thereto, are this day forwarded to you by mail, with certain sections referring to "reserve of legal money," and "limitation of liability of borrowers" marked. You will examine into the condition of the business of each bank, counting its cash and examining notes, bills, government and other securities. Note lawful money and see if it equals 15 per cent. of circulation outstanding and deposits and see if all notes and bills have proper internal-revenue stamps. You will also examine the records of the directors, and ascertain whether the action of the board and the result of elections have been recorded, and whether they have copies of all papers used in organization. Also, whether one-tenth of net profits for preceding six months (up to *last* dividend) has been carried to "surplus fund," also if estimated premiums on stocks, and interest secured but not collected form any portion of, or are included in, the assets or profits of the bank. See if premiums paid on United States bonds have been charged up and paid off, or still remain as liabilities of the bank. Inquire or examine into the general character of the paper discounted, and see if it is regular and legitimate, and generally see if the bank is endeavoring to do business according to the spirit and intent of the law, or if it seeks to evade any of its requirements. Report as to condition and safety of vault and locks, as well as location and convenience of office; also, as to bank experience and business qualifications of the cashier, and whether the directors hold the requisite amount of stock.

Yours, respectfully,

S. T. HOWARD,
Deputy Comptroller.

S. M. CUTCHEON, Esq.,
Bank Examiner, Ypsilanti, Mich.

[Inclosure No. 3.]

TREASURY DEPARTMENT,
OFFICE OF COMPTROLLER OF THE CURRENCY,
Washington, June 22, 1865.

DEAR SIR: I inclose herewith list of national banks organized in the States of Connecticut and Rhode Island, prior to the 21st instant, which you will proceed to examine at your pleasure. Also are inclosed forms for your reports of examination, blank books, envelopes, &c., necessary for your use.

For your guidance, the following is a summary, in part, of your duties: You are referred to the printed instructions of this office, entitled "Instructions and Suggestions of the Comptroller," a copy of which, together with the act and the recent amendments thereto, are this day forwarded to you, with certain sections referring to "reserve of lawful money," and "limitations of liabilities of borrowers," marked.

You will examine into the condition of the business of each bank, counting its cash, examining notes, bills, government and other securities.

Note lawful money reserve, and see if it equals 15 per cent. of circulation outstanding, and deposits, and if the proper amount is on hand. If all notes and bills have proper internal-revenue stamps.

You will also examine the records of the directors, and ascertain whether the actions of the board and the result of elections have been recorded, and whether they have copies of all papers used in organization. Also, if one-tenth of net profits for preceding six months (up to last dividend) has been carried to "surplus fund." Also, if premium on stocks, and interest accrued but not collected on any portion thereof, are included in the assets or profits of the bank; see if premiums paid on United States securities and expense account have been charged up and paid off, or still remain as assets.

Inquire or examine into the general character of the paper discounted, and find if it is regular and legitimate; and if the banks are endeavoring to do their business in all respects in accordance with the spirit and intent of the law, or if any seek to evade its requirements.

You will pay particular attention to the capital stock. See that it is all real and actually paid in.

Report as to condition and safety of vaults and locks, as well as location and convenience of officers. Also, as to banking experience and business qualifications of presidents and cashiers, and whether or not directors hold the requisite amount of stock.

You will please keep me advised as to your whereabouts, so that you may be addressed at any time; also, advise when you are in want of forms.

Very respectfully,

F. CLARKE,
Comptroller.

ANDREW B. MYGATT, Esq.,
National Bank Examiner, Hartford, Conn.

[Inclosure No. 4.]

TREASURY DEPARTMENT,
OFFICE OF COMPTROLLER OF THE CURRENCY,
Washington, May —, 1866.

DEAR SIR: Your letter of the — instant is received. In reply, I have to state that I consider depositing money by national banks with private bankers, bearing interest, and payable on call, a violation of the twenty-ninth section of the currency act, when "such deposit exceeds one-tenth part of the capital of the bank making such deposit."

Very respectfully, yours,

F. CLARKE,
Comptroller.

SIR: You will please instruct banks in the above regard, according to this recent decision of the Comptroller.

Very respectfully,

H. R. HULBURD,
Deputy Comptroller.

[Inclosure No. 5.]

(Circular letter.)

TREASURY DEPARTMENT,
OFFICE OF COMPTROLLER OF THE CURRENCY,
Washington, May 31, 1875.

SIR: You are directed, in making examinations of national banks hereafter, to examine all canceled checks, drafts, and other vouchers, which are required to be stamped with a two-cent stamp, by the act of February 8, 1875 (see page 61 of the new edition of the national bank law), and report to this office the number of checks which have not been stamped as required by law. You will also report whether, in your opinion, the two-cent stamp has been omitted from checks and other vouchers with intent to evade the law.

If there is evidence that any of the unstamped checks or vouchers have been previously stamped and the stamp accidentally detached, you should report the numbe of such checks or vouchers.

If the canceled checks of any national bank shall have been already examined by an officer of the internal revenue, then only such checks as have since accumulated will require examination.

If any considerable time shall be consumed in making the examination of canceled checks, you will report the time so consumed, together with the number of checks examined; and when it is necessary to make a report of any considerable length, you are requested to make such report separate from the regular bank report, in order that a copy of the same may be transmitted to the Commissioner of Internal Revenue for his information.

I inclose herewith copies of the law requiring the affixing of the two-cent stamp to bank checks and other vouchers, and also copies of the circular of the Commissioner of Internal Revenue, April 12, 1875.

N. B.—Officers of the government are not required to affix the two-cent stamp upon checks drawn by them officially.

Very respectfully, JOHN JAY KNOX,
Comptroller.

——— ———, Esq.,
National Bank Examiner.

(Circular letter.)

TREASURY DEPARTMENT,
OFFICE OF COMPTROLLER OF THE CURRENCY,
Washington, June 26, 1875.

SIR: As the examiners do not in all cases report the information in reference to the examination of stamps on checks and other vouchers that they were desired by the letter of instructions of May 31, ultimo, to give, attention is called thereto, and it is particularly requested that they will set forth in their reports *precisely* the information asked for in the letter referred to.

The points on which reports are desired are repeated for their information and are as follows:

1. The number of checks and other vouchers (if any) found without the proper stamp affixed.

2. An expression of opinion from the examiner whether failure to affix stamps to checks, &c., found unstamped was with intent to evade the requirements of the law on the subject.

3. Whether there is evidence that any checks, &c., found unstamped had originally been stamped and the stamp afterwards accidentally become detached, and the number of such checks.

Examiners are again directed to follow the instructions implicitly.

The examination of checks is to be made at the time of making the regular examination.

Very respectfully, JOHN JAY KNOX,
Comptroller.

——— ———, Esq.,
National Bank Examiner.

[Inclosures No. 6.]

No. of bank, 1665.

Examiner's report of the condition of "The National Bank of the State of Missouri, located at Saint Louis, in the county of Saint Louis, State of Missouri, at 9 o'clock a. m., March 16, 1877.

JAMES H. BRITTON, *President.* EDWARD P. CURTIS, *Cashier.*

RESOURCES.

1.	Notes and bills discounted		$3,651,526 97
2.	Overdrafts		35,850 21
3.	United States bonds to secure circulation		50,000 00
4.	United States bonds to secure deposits		106,000 00
5.	United States bonds on hand		
6.	Other stocks, bonds, and mortgages		456,531 00
7.	Due from approved reserve agents, viz:		
	National Commerce, N. Y.	$153,791 73	
	National Republic, N. Y.	17,164 61	
			170,956 34

8. Due from other national banks			$19,133 61
9. Due from State banks and bankers			12,995 12
10. Banking house			
11. Other real estate	$273,820 33		
12. Furniture and fixtures	11,283 70		
			285,104 03
13. Current expenses	9,182 08		
14. Taxes paid	68,769 89		
			77,951 97
15. Premiums paid			
16. Checks and other cash items			101,225 50
17. Exchanges for clearing-house, including gold checks			29,955 45
18. Bills of other national banks			81,031 00
19. Bills of State banks			
20. Fractional currency (including nickels)			879 40
21. Specie, viz:			
Silver coin	$472 00		
Gold coin	1,490 25		
Gold Treasury notes			
			1,962 25
22. Legal-tender notes			260,000 00
23. United States certificates of deposit for legal tenders			
24. Five per cent. redemption fund with Treasurer United States			2,250 00
25. Other funds with Treasurer United States			1,000 00
Suspended debt			274,619 38
Samuel Hayes			5,000 00
Cash short			7 99
Total			5,623,980 22

LIABILITIES.

1. Capital stock paid in			$2,500,000 00
2. Surplus fund			248,775 52
3. Discount			
4. Exchange			
5. Interest			
6. Premiums			
7. Profit and loss	$68,114 27		
			68,114 27
8. Circulation received	44,860 00		
On hand and returned			44,860 00
9. State bank circulation outstanding			
10. Dividends unpaid			18,143 00
11. Individual deposits, viz:			
Subject to check	936,080 30		
Demand certificates	10,397 06		
Time certificates	787,270 35		
Certified checks	2,832 83		
Cashier's checks	4,736 95		
			1,741,317 49
12. United States deposits			
13. Deposits of United States disbursing officers			
14. Due to National banks			90,468 16
15. Due to State banks and bankers			465,301 78
16. Notes and bills rediscounted			307,000 00
17. Bills payable			140,000 00
Cash over			
Total			5,623,980 22

Records: In good condition.

Other books: Good methods, and well kept.

President: Reported in detail hereafter.

Cashier: Competent officer, but has allowed himself to get slack in many of the affairs of the Bank, notably in bills receivable, morally excellent.

Directors: Only four; no election since 1872.

Stockholders: 494; 3,458 shares owned at the East—remainder in the West, scattered all over Missouri. Very many not known to the officers; strength unknown.

Office: Very fine, in new Chamber of Commerce building.

Safe: Old and ordinary; vault strong and fire-proof.

DIVIDENDS AND SURPLUS.

(Section 5199 of the Revised Statutes of the United States.)

Date of last dividend, July 10, 1876; amount, $87,500.00; carried to surplus, $———.

LOANS AND DISCOUNTS.

On paper with two or more individual or firm names	$2,108,665 15
On mortgages and other real-estate security	82,112 24
On other stocks, bonds, &c., payable on demand	1,352,393 47
All other loans	108,356 11
Included in the above are:	
Bad debts, as defined in section 5204 of the Revised Statutes of the United States	249,969 77
Other suspended and overdue paper	775,622 40
Liabilities of directors (individual and firm) as payers	708,090 64
*Loans exceeding the limit prescribed by section 5200 of the Revised Statutes of the United States, viz:	
J. H. Britton	253,664 26
Jas. F. How	265,976 67

GENERAL REMARKS.

In preparing the first page of this report, I have preferred to exhibit the separate accounts as nearly as possible, as shown on the ledger of the bank, and to report in detail on each item.

Notes and bills discounted.—Of these it will be observed, considerably over a million of dollars are overdue, $13,000 since 1867, $217,000 since 1869, $26,000 since 1870, $35,000 since 1871, $72,800 since 1872, $33,000 since 1873, and a very large proportion of the remainder since 1874 and 1875.

Of the overdue paper $249,969.77 is known to be worthless, and I class over $406,000 as of extremely doubtful value; including Saint Louis and Southeastern Railway $79,000 due in 1874 and 1875, Richard L. Dickson $132,673.49 due July 1, 1869, Chas. K. Dickson, $130,766 due in 1869, 1870 and 1871, Alexander H. Kramer $10,000 due in February 1874, and Murdock & Dickson $46,204 due in 1872 and 1873.

James B. Eads, a director, owes the bank, by notes	$249,619 89
James F. How owes the bank, by notes	265,976 67
George C. Fabian owes the bank, by notes	36,000 00

Mr. Eads is very wealthy *in the future*, contingent on his success with his South Pass jetty business, but at present very short of cash.

How and Fabian are not known to be worth anything, and, to the best of my information, the jetty contingency involves them. As collateral to $180,000 of How's paper is an assignment for the same amount from the next expected payment to Eads from the United States Government on account of South Pass jetties.

J. H. Britton, the president, owes the bank, by notes, 253,664.26. Mr. Britton is generally accounted wealthy. He holds a large quantity of stocks and bonds of insolvent Missouri railroads, Saint Louis local stocks of very low value, Illinois and Saint Louis Bridge stock, worth $3, and various lead and other stocks of questionable value. I have a serious doubt if he is worth his indebtedness to the bank, even counting his bank stock, 1,542 shares. This may be a mistake. I hope it is; but my judgment is formed from observation in the bank and information out.

Barton Bates, a director, owes the bank, by notes, $179,681.49. Mr. Bates owns many thousand acres of land in Missouri, but in convertible property I think he is poor. I understand he has jetties in his mind. His value is uncertain.

The estate of Charles K. Dickson, by J. B. Eads and Barton Bates, trustees and executors, owes the bank, by notes, $75,000 (in addition to the $130,766 mentioned on preceding page), which has no collateral, the individual notes of James B. Eads and Barton Bates to the amount of $25,000, 397 shares of Illinois and Saint Louis Bridge stock, worth $3 per share, and 1,111 shares Granby Mining and Smelting Company—the latter a close corporation, making money, and the shares probably of some value; but how much I cannot learn. This indebtedness is shown by one note dated November 1, 1871, for $25,000, and one for $50,000, dated November, 1872, both payable on demand.

The Illinois and Saint Louis Bridge Company shows a debt of $117,951.46 due in May and July, 1875, with collateral notes to the amount of $183,867.55, executed by

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*The law does not restrict loans on commercial or business paper, but only loans upon accommodation or other than business paper.

James B. Eads, Barton Bates, and James H. Britton. Mr. Britton says his notes are valueless, he having an offset in a claim for salary as president of the company. As collateral to the indebtedness of Britton, Eads, and Bates, the bank holds stocks, of Britton, $63,590; Eads, $18,999; Bates, $59,554, marketable at these figures.

Jno. A. Ubsdell owes the bank $215,978.50 shown by eight demand notes made in 1867-'68-'69-'70, and later. Mr. Curtis thinks Mr. Ubsdell is somewhere in Europe; does not know where; says he pays no attention to his paper. Interest is credited to profit and loss every July and January, a ticket, made for the amount and carried in "Cash." Of this item, with more of the same character, mention will be found hereafter, under the head of "cash items." Mr. Curtis says John A. Ubsdell is good. I have been unable to confirm or disprove it.

The bank holds a demand note of A. M. Britton (son of the president) for $32,122.67, dated January 1, 1873. I think this is worth only the collaterals which is marketable for $4,710. A. M. Britton was one of the corporators of the Saint Louis Life Insurance Company, now defunct, and Britton and his partner, one Lomax, are under indictment for perjury. They were worth nothing when they went into the business, and are believed to be completely wrecked.

Mortgage paper.—In paper of this class is D. H. Armstrong, $52,170, secured by deed of trust to property in Saint Louis, valued in excess of indebtedness. Trust deed dated January 20, 1876.

Wm. Taussig, $20,000 secured by deed of trust of January 6, 1876, to residence property on Lafayette Park, Saint Louis, valued at $20,000.

Four other pieces, aggregating $9,942.24, secured by deeds of trust in different counties in Missouri, deeds dated in 1868, 1870, and 1871.

I found no way of valuing this property except by comparison with sales made by the bank in the same counties. It is perhaps worth what it is intended to secure. All this taken legally.

The paper not heretofore described is assumed to be good, but considering the habits of the bank, the state of trade, and the possessiou of so much that is notoriously worthless, a reasonable doubt may be entertained of the value of a considerable portion of it. The paper will hardly be undervalued by the following classification.

Total paper		$3,651,526 97
Surely bad	$249,969 77	
Doubtful, probably bad	406,000 00	
		655,969 77
		2,995,557 20

Over drafts, about the average, are believed to be good, as given in the report. They do not include about $50,000 of overdraft of the treasuer of an insurance company, covered by collateral, Missouri 6 per cent. bonds, of a like amount.

Other stocks, bonds, and mortgages.—The property listed below was valued, as far as valued, by intelligent brokers and others, well-informed gentlemen of Saint Louis.

Telegraph scrip (lost), cost	$110 00	worth nothing.
Scotland County warrant (lost), cost	100 00	worth nothing.
81 shares Saint Charles bridge stock	8,100 00	worth nothing.
2,517 shares Saint Louis, Kansas City and Northern common stock	25,170 00	$10,068 00
1,922 shares Saint Louis, Kansas City and Northern preferred stock	67,255 50	26,218 00
400 shares Union Railway Transit Company, Saint Louis.	40,000 00	40,000 00
100 shares Union Railway Transit Company, Illinois	10,000 00	10,000 00
Saint Louis Chamber of Commerce Association stock	50,000 00	nothing.
7 Lincoln County, Missouri, bonds, $500 each	3,220 00	2,450 00
400 shares Railway Supplies Manufacturing Company	6,332 00	nothing.
175 shares Illinois and Saint Louis Railroad Coal Company.	10,912 50	13,125 00
94 shares Third National Bank of Saint Louis	8,460 00	7,990 00
721 shares National Bank of the State of Missouri	46,371 00	(?)
361 bonds, $500 each, Saint Louis, Ottumwa and Cedar Rapids Railroad	180,500 00	90,250 00

There is an uncertainty concerning the latter item. The price given me was 50 cents; counting them at that rate, omitting any valuation on the stock of the bank, the result will be—

Total cost of stock	456,531 00	200,011 00
Worth	200,011 00	
Loss	256,520 00	

Included in "due from State banks and bankers" is a debit to two banks in Missouri, broken many years ago; aggregate a loss of $3,500.

Other real estate.—One item in this account is 90 feet on Fourth street, Saint Louis, by 50 feet on Olive street, charged at $150,488.43, purchased August 5, 1869, for a banking-house and never used for that purpose. This property is now offered at $135,000, and in view of a rental of about $15,000 is probably worth that sum, but certainly only a considerable concession from this price would sell it now. Fifty-one different pieces and tracts in Saint Louis and nearly as many different counties in Missouri make up the remainder. I spent a day in the investigation of this property. The assistant cashier, Mr. Ross, gives his exclusive attention to this branch of the business, and is very familiar with it. Taking sales as a basis, and liberally discounting them, I have made the following estimate of value. This, however, not a cash valuation, for, excepting the lot bought for banking purposes and a few pieces in Saint Louis City, there can be no cash price made.

Real estate, cost	$273,820 33
Real estate, worth	299,209 50
Profit	21,389 17

All but $56,783.22 of the real estate has been held over five years, and, excepting the banking-house lot, nearly all received from the old "Bank of the State of Missouri" and its branches.

Furniture and fixtures of the bank cost a little over $3,000. The amount charged to this account in excess of $3,000 is an accumulation from former banking-rooms, and may be set down as a *loss* of $8,000.

Expenses of the bank are not disproportioned to the business.

Taxes are as appearing on the statement.

"Cash items" include $99,803.54 "interest tickets." These are memorandums made July 1, 1876, and January 1, 1877; credited to profit and loss at the time made, and charged to "cash" for the simple reason that the accounts of persons to be debited were not good for a debit. "Cash" was also increased thereby, and an increase of overdrafts avoided. These tickets are summarized as follows:

Jno. A. Ubsdell	$15,276 77		
Barton Bates	8,486 01		
C. W. Bates	1,360 03		
Jas. H. Britton	28,535 32		
Geo. F. Britton	2,059 26	not good,	$2,059 26
A. M. Britton	3,019 34	not good,	3,019 34
Eads & Bates, trustees and executors of estate of Chas. K. Dickson	10,059 94	not good,	10,059 94
R. L. Dickson	10,790 72	not good,	10,790 72
J. A. Dillon	2,602 67	not good,	2,602 67
J. B. Eads	8,453 34		
J. L. Walsh	2,043 50		
Jno. J. Roe	7,116 64		
	99,803 54	Loss,	28,531 93

Right here I should add that the bank holds three notes of John J. Roe, deceased, dated February 28, 1867; March 4, 1869; June 5, 1868, aggregating $102,000, with collateral of 1,000 of its own shares. Roe's estate is said to be good.

Legal reserve has been very low for nearly two months.

"Suspended debt" $274,619.38 represents paper chargeable to profit and loss. Mr. Curtis says he believes $100,000 of this will ultimately be good. I will discount his judgment 50 per cent. and leave a *loss* of $224,619.38.

The item "Saml. Hayes" belongs to the same category, with no redeeming features. It is worthless. Loss, $5,000.

Reviewing thes oregoing, I find my estimate of losses as follows:

On paper	$655,969 77
On stocks	256,520 00
On bank overdrafts	3,500 00
On furniture	8,000 00
On cash items	28,531 93
On suspended debt	224,619 38
On Samuel Hayes	5,000 00
	1,182,141 08

Your letter, sir, of March 9, current, of which this examination and report are the result, directs me to make such an examination, and to obtain through appropriate

channels such information as will enable me to give a reliable expression of opinion as to the value of the stock of this bank. The liabilities are as per the first page of this report. I think, sir, that its assets can only be valued, even approximately, after almost numberless suits and compromises.

I had the aid of three gentlemen now and for thirty years past actively and successfully engaged in banking in Saint Louis, whose names for reasons understood are withheld from this report; and, although they have not seen my figures, it is believed their valuation of these assets would not exceed mine.

As before intimated, I believe the ultimate payment of nearly all the Eads, How, Fabian, Dickson, and Bridge paper depends on the continued success of the South Pass jetties. Should Eads live and encounter no discouragements in that enterprise, there is prospect of full liquidation of his, How's, and Fabian's paper sometime, but not early.

Of the Britton and Barton indebtedness there is probably a large portion contingent on the jetties for value.

That the officers of the association have grossly violated the law and all principles of sound and safe banking, there cannot be two opinions among the informed. That their only course is another large reduction of capital is equally plain. Whether or not the community could stand such a reduction, I am uncertain.

In my report, in its place, I have reported the cashier "morally excellent." I wish to qualify that somewhat. Can a man be morally excellent and swear to the correctness of such a report as was made by that bank on January 20, last, particularly as to "cash" and "bills" overdue? There was no less overdue paper then than now. The same cash tickets for interest were carried then as now. My reference was to the natural moral instincts, the true inwardness of Mr. Curtis, and his fine personal habits.

The by-laws of the association require seven directors, four making a quorum. The action of the 27th of April, 1876, reducing the capital was taken in a meeting of only *three* directors. Nearly all the late meetings have had but three directors, and the total board is four.

The time certificates are drawn payable at some certain date in the future, and bear interest, 4 per cent. for three months, 5 per cent. for four months, and 6 per cent. for six months or more.

Interest is paid to banks at 4 per cent.

Rediscounts are at National Bank of Commerce, New York.

Bills payable, $100,000 National Bank of Commerce, New York; $40,000 National Bank of the Republic, New York.

I learned that the shares of the bank sold in April, 1874, down to the reduction of capital, at 70 to 75. Since the reduction, 70 down to 60, its present price. At this price the president, for the bank, is almost daily buying some. I know of the purchase of 85 shares since the commencement of this reported examination.

Taking my estimate of losses on page 7, it will be seen that my valuation of the stock is not over $59.50 per share. Even at these figures, I have given the stock the benefit of many a doubt.

Wishing this safe to hand, and its shortcomings unnoticed, I remain, sir, your obedient servant,

WM. P. WATSON,
Examiner.

To the COMPTROLLER OF THE CURRENCY.
Washington, D. C.

[Inclosure No 7.]

No. of Bank ——.

Examiner's report of the condition of the German American National Bank, located at Washington, D. C., at 9 o'clock a. m., April 18, 1878.

JOHN HITZ, *President.* C. E. PRENTISS, *Cashier.*

RESOURCES.

1.	Notes and bills discounted	$202,108 40
2.	Overdrafts	5,507 46
3.	United States bonds to secure circulation	70,000 00
4.	United States bonds to secure deposits	
5.	United States bonds on hand	50 00
6.	Other stocks, bonds, and mortgages	700 00

7. Due from approved reserve agents, viz:			
Importers and Traders' New York			41,142 63
8. Due from other national banks			4,591 17
9. Due from State banks and bankers			2,275 92
10. Banking-house		$120,533 98	
11. Other real estate		11,172 65	
12. Furniture and fixtures		17,498 05	
			149,204 68
13. Current expenses			
14. Taxes paid			10,899 48
15. Premiums paid			7,406 67
16. Checks and other cash items			7,498 11
17. Exchanges for clearing-house, including gold checks			
18. Bills of other national banks			
19. Bills of State banks			
20. Fractional currency (including nickels)			459 76
21. Specie, viz: Coin			1,209 40
22. Legal-tender notes			9,004 00
23. United States certificates of deposit for legal tenders			
24. Five per cent. redemption fund, with Treasurer United States			3,150 00
25. Other funds with Treasurer United States			
Taxes in litigation			5,107 73
Cash short			116 17
Total			520,431 58

LIABILITIES.

1. Capital stock paid in			$130,000 00
2. Surplus fund			2,000 00
3. Discount		$8,636 95	
4. Interest			
5. Exchange		1,483 39	
6. Rent		3,099 43	
7. Profit and loss		1,566 55	
			14,786 32
8. Circulation received	$		
On hand and returned			62,300 00
9. State bank circulation outstanding			
10. Dividends unpaid			
11. Individual deposits, viz:			
Subject to check		$263,488 67	
Demand certificates		19,877 30	
Time certificates			
Certified checks			
Cashier's checks			
			283,365 97
12. United States deposits			
13. Deposits of United States disbursing officers			
14. Due to national banks			12,942 11
15. Due to State banks and bankers			15,037 18
16. Notes and bills re-discounted			
17. Bills payable			
Cash over			
Total			520,431 58

Records: Well kept.
Other books: Same.
President: John Hitz.
Cashier: C. E. Prentiss.
Directors: Seven in number, owning collectively 585 shares, par $100.
Stockholders: Thirty-six in number.
Office: Good.
Safe: New Miller's fire and burglar proof

LOANS AND DISCOUNTS.

On paper with two or more individual or firm-names	$68,095 07
On mortgages and other real estate security	113,022 17
On other stocks, bonds, &c., payable on demand	20,991 16
Included in the above are:	
Other suspended and overdue paper	1,122 01
Liabilities of directors (individual and firm) as payers	11,723 04

GENERAL REMARKS.

The real estate (other than banking house) held by the bank is as follows:
No. 413 Sixth street S.W., 2½-story brick dwelling valued at $2,960; rents $25 per month. T street N.W., 2½-story brick dwelling valued at $1,203.33; rents $10 per month. T street N.W., 2½-story brick dwelling valued at $1,226.47; rents $10 per month. Four frame dwellings, Twelfth near Boundary, valued at $4,962.69; rents $12 per month each. Nos. 76 and 78 G street east, frame dwelling valued at $830.16; rents $5 per month each.

The stocks and bonds (other than United States) owned by this bank are:

One share Washington Brick Machine Company....	$500 00	
Tax certificate assessment.....	200 00	
		$700 00

The expense account of this bank attracting attention from its large amount, I have carefully examined said account back to the inauguration of the institution as a national bank, May 15, 1877.

I find that since that date this account has been charged $23,803.90 in all, distributed thus:

Salaries.....	$6,600 84
United States taxes	1,832 50
City taxes	2,401 46
Insurance	1,233 43
Repairs to real estate.....	3,657 34
Rent of banking house	2,479 92
Miscellaneous, including stamps, stamped paper, stationery, books, checks, &c	5,598 41
	23,803 90

The premium account is in course of reduction, at the rate of 10 per cent. semi-annually, and the officers of the bank assure me that no dividends will be paid to stockholders until this account is closed out.

The account United States taxes in litigation represents certain taxes paid by the bank under protest. It was originally paid under protest, was refunded by the Commissioner of Internal Revenue, and then subsequently by his successor declared to be due and collected. The case is now in suit to recover this amount, but no dividends will be paid until this account is closed.

The real estate (other than banking house) is carried at a very moderate figure, and will be sold off as opportunity offers.

The real-estate notes (remaining over from savings bank) are, in my opinion, of good character and fairly secured. It is expected that within the next 60 days the amount held will be reduced some $30,000.

The real-estate notes held at the time of last examination have been materially reduced, some $97,600 having been closed out during the year. The list now stands:

Name.	Date.	Amount.	Remarks.
T. P. Morgan	Aug. 2, 1869	$4,800 00	Secured on stone mill, Georgetown.
Jerusalem Church.....	July 8, 1870	4,000 00	Secured on stone church, Capitol Hill.
P. Belden	Sept. 3, 1870	8,000 00	Secured on wharf property, New Haven, Conn.
G. A. Scott.....	Dec. 27, 1872	1,600 00	Secured on No. 309 H street, S. E.
W. F. Clarkson	July 17, 1872	800 00	Secured on lot 1, square 1047; 2 dwellings.
I. I. Fisher.....	Jan. 18, 1873	600 00	Secured on part lot 25, square 557; 1 dwelling.
——— Hall.....	Feb. 25, 1873	2,555 00	Secured on dwelling near Howard University.
G. A. Haske	May 5, 1873	1,500 00	Secured on No. 229 Pennsylvania avenue, east; 2 dwellings.
I. H. Darrow.....	May 24, 1873	26,000 00	Secured on 13 brick dwellings, square 206; indorsed.
R. H. Ryan	Jan. 31, 1874	1,000 00	Secured on 419 New Jersey avenue; brick dwelling.
L. I. Crane.....	Oct. 1, 1874	6,000 00	Secured on No. 1330 Eleventh street, S. W.; brick dwelling.
W. Baden.....	May 16, 1873	1,800 00	
W. E. Kennaugh	Apr. 27, 1875	2,338 00	Secured on corner Tenth and F streets, S. W.; brick dwelling.
P. Teagle	June 15, 1875	900 00	Secured on No. 117 Fourteenth street, N. W.
R. Beresford	Nov. 1, 1875	4,200 00	Secured on 6 frame dwellings, Tenth and V streets, N. W.
W. R. Chipley	Jan. 5, 1876	20,000 00	Secured on 5 brick dwellings, Ninth and G streets, N. W.
H. C. Ross	Feb. 8, 1876	201 87	Secured on No. 1804 T street; brick dwelling.

Name.	Date.	Amount.	Remarks.
A. G. Desher	Apr. 18, 1876	500 00	Secured on No. 1239 Sixth street, S. W.; frame dwelling.
G. F. Smallwood	Aug. 31, 1876	725 00	Secured on part lot 13, square 211; brick dwelling.
E. P. Halstead	Oct. 20, 1876	3, 200 00	Secured on No. 1224 Maryland avenue, N. E.
I. N. Dweyer	Mar. 24, 1877	2, 000 00	Secured on lot 2, square 371; note indorsed.
R. H. Ryan	Mar. 31, 1877	7, 500 00	Secured on 406 New Jersey avenue; 2 brick dwellings.
G. A. Haske	Feb. 22, 1877	2, 051 67	Secured on 229 Pennsylvania avenue, S. E.; frame dwelling.
I. H. Brooks	Apr. 27, 1877	1, 210 17	Secured on frame dwelling, corner Eighth street and Grant avenue.
Jas. Burnd	Apr. 27, 1877	862 99	Frame dwelling on Grant avenue.
E. Webster	June 7, 1877	1, 500 00	Brick dwelling, 1542 Columbia street.
Do	June 7, 1877	1, 500 00	Brick dwelling, corner Eleventh and O streets.
A. J. Gunning	May 15, 1877	1, 656 70	Frame dwelling, Eighth street, east.

In the list is carried some $2,500 tax-lien certificates, District of Columbia, which do not properly belong; they are not included above.

B. U. KEYSER,
Examiner.

To the COMPTROLLER OF THE CURRENCY,
Washington, D. C.

[Inclosure No. 8.]

TREASURY DEPARTMENT, OFFICE OF COMPTROLLER OF THE CURRENCY,
Washington, May 1, 1878.

GENTLEMEN: The report of an examination of your bank, made on the 18th ultimo, has just been received. I am pleased to see from the report that the paper secured by liens upon real estate held by the bank has been considerably reduced during the last year, but the amount still held is very large, and there are notes among it which have been running for many years, indicating perhaps that the money cannot be realized for them as readily as is desirable. There are also other matters in the condition of the bank of a very undesirable character, as appears from the report.

At the date of the examination the reserve of lawful money was $18,611 too little in the aggregate, and the proportion of funds on hand available for reserve was $26,270 too little. This shows that the business of the association has been too much extended, and hereafter the loans and discounts must be so limited as to admit of the reserve being kept good. The amount required under existing provisions of law is very moderate, and must be maintained.

The loss on account of the overvaluation of the premium account of the bank, which at present market rates is $6,594.17, and the debit balances to the expense and tax accounts, together aggregate more than the surplus fund and other accumulated earnings on hand, thus showing that the capital stock of the bank is somewhat impaired.

There is also an amount of $5,107.73 reported as "taxes in litigation," which, if the bank has to pay, will increase by that much the amount of unavailable assets. Under these circumstances the bank is not in a condition to pay a dividend, and none must be made until all losses shall be deducted from the earnings as required by section 5204 of the Revised Statutes of the United States, and the assets placed in all respects upon a sound and satisfactory basis.

The amount of real estate and real-estate paper owned by the association is, as its managers must be aware, a great hinderance to its doing a profitable business, and I urgently advise that the real estate other than the banking house be sold, and that no efforts be spared to collect the notes secured by mortgages and trust deeds, particularly those which have been running for so long a time.

The expenses which the bank is under are exceedingly large, and unless some method of lessening them can be arrived at, I fear that it can hardly be expected that the business of the association can be conducted at a profit to the stockholders. This is a subject that requires the careful consideration of the directors.

The amount of overdrafts reported is quite considerable, and indicates that accommodations are given in this irregular way to too great an extent.

I urgently advise that the practice of permitting overdrafts be entirely discontinued, and promissory notes in proper form, which can be made payable on demand if desired, be taken for all loans made hereafter.

Please bring this letter to the attention of the directors, and let me hear from you fully in reply to it at your early convenience.

Very respectfully,

JNO. JAY KNOX,
Comptroller.

C. E. PRENTISS, Esq.,
Cashier German-American National Bank, Washington, D. C.

[Inclosure No. 9.]

(2358.)

THE GERMAN-AMERICAN NATIONAL BANK OF WASHINGTON,
Washington, D. C., June 24, 1878.

DEAR SIR: Your letter of the 1st ultimo (previously acknowledged) was, as requested, brought to the attention of our directors, and the various points carefully discussed at several meetings, and I am directed by them to give you the following information:

We are constantly in the effort to reduce the amount of our loans on real estate made during our existence as a savings bank, both with the object of eventually getting rid of them entirely and of bringing our reserve up to the required standard.

Since March 18, the date to which you refer, our books show a diminution in this class of loans of some $28,000, being a very large proportion of the whole.

We have also, as our reports will show, largely reduced our total of loans and discounts, but you will readily understand that a rapid curtail of the latter means of accommodation to our business dealers would tend rather to diminish than increase our reserve by the falling off of our deposits, which would naturally ensue.

We have preferred rather to look to the payment of our real estate loans and their transfer by sale to other parties to accomplish this, and our directors have individually undertaken to relieve the bank of as many of these loans as possible, holding them until an improvement in business shall enable them to enforce their payment without loss.

Of course the excessive amount of our premium account is due to the shrinkage in the value of the United States securities held by the bank. You will observe that we reported on the 1st of May a reduction of about one-fifth of the total of this account by charging some $1,500 of it off to profit and loss.

Our board wishes me here to state that no dividend will be declared by them until the condition of the bank fully warrants it, with the approval of your office.

In regard to the real estate held by the bank, every effort is making to dispose of it, and negotiations are now pending for the sale of two or three pieces of it. The banking-house is regarded by business men as very finely located for our purpose, and it yields a fair income. Our arrangements are such that we calculate within five years or thereabouts to dispose of a large part of it greatly to the advantage of the bank.

Of course the large amount of real estate held by the bank adds in taxes and repairs, &c., largely (indeed the largest part) to our expense account; but our expenditures for this account have been brought within the narrowest limits, and since the receipt of your letter our board has been able to reduce our already limited salary account over $1,000 per annum.

The amount of our overdrafts (temporarily large at the time our report was made) has been decreased to a comparatively small sum, and rigid instructions in regard to allowing any in future given to our officers.

In concluding this letter, I am instructed to say that the circumstances attending our being transferred from a savings to a national bank, having previously transacted our business solely as a savings bank, following the universal custom of such banks to invest largely in real estate, and conducting our business without discounts, have aided largely in adding to the difficulties attending a strict and literal compliance with the requirements of your office concerning national banks generally; and our directors (who are all men of means and standing in this district, few ever asking accommodation of the bank, and owning a very large share of its stock), express the desire that you will consider these circumstances and aid the bank by your advice in its efforts to overcome all obstacles and retain the excellent business we have established.

Respectfully,

C. G. PRENTISS,
Cashier.

Hon. JOHN J. KNOX,
Comptroller of the Currency.

[Inclosure No. 10.]

No. of Bank, ——.

Examiner's report of the condition of the German-American National Bank, located at Washington City, D. C., at 9 o'clock a. m., October 30, 1878.

JOHN HITZ, *President.* CHAS. E. PRENTISS, *Cashier.*

RESOURCES.

1. Notes and bills discounted		$206,206 28
2. Overdrafts		16,721 39
3. United States bonds to secure circulation		70,000 00
4. United States bonds to secure deposits		
5. United States bonds on hand		50 00
6. Other stocks, bonds, and mortgages		2,712 39
7. Due from approved reserve agents, viz:		
Chem. National Bank, New York		2,052 22
8. Due from other national banks		207 44
9. Due from State banks and bankers		9,681 99
10. Banking house	$120,533 98	
11. Other real estate	11,290 53	
12. Furniture and fixtures	17,498 05	
		149,322 56
13. Current expenses		
14. Taxes paid		9,182 72
15. Premiums paid		6,000 00
16. Checks and other cash items		2,363 54
17. Exchanges for custom-house, including gold checks		
18. Bills of other national banks		211 00
19. Bills of State banks		
20. Fractional currency (including nickols)		68 76
21. Specie, viz:		
Coin		466 69
Gold Treasury notes		
22. Legal-tender notes		50 00
23. United States certificates of deposit for legal tenders		
24. 5 per cent. redemption fund with Treasurer of United States		1,350 00
25. Other funds with Treasurer of United States:		
Certified check account		413 21
United States taxes in litigation		5,107 73
Cash short		363 85
Total		482,531 77

LIABILITIES.

1. Capital stock paid in		$130,000 00
2. Surplus fund		2,000 00
3. Discount		
4. Exchange	$1,406 86	
5. Interest	6,173 86	
6. Rent account	2,361 61	
7. Profit and loss	2,013 16	
		11,955 49
8. Circulation received		
On hand and returned		63,000 00
9. State bank circulation outstanding		
10. Dividends unpaid		
11. Individual deposits, viz:		
Subject to check	$240,787 39	
Demand certificates	11,537 99	
Time certificates		
Certified checks		
Cashier's checks		
		252,325 38
12. United States deposits		
13. Deposits of United States disbursing officers		

14. Due to national banks	15,273 87
15. Due to State banks and bankers	7,977 03
16. Notes and bills re-discounted	
17. Bills payable	
Cash over	
Total	482,531 77

Records: Tolerably well kept.
Other books: Tolerably well kept.
President: John Hitz.
Cashier: Charles E. Prentiss.
Directors: Seven in number, owning, collectively, 258 shares.
Stockholders:
Office: Good.
Safe: Fire and burglar proof vault.

LOANS AND DISCOUNTS.

On paper with two or more individual or firm names	$121,235 02
On mortgages and other real-estate security	75,971 26
On other stocks, bonds, &c., payable on demand	9,000 00
Included in the above are:	
Other suspended and overdue paper	21,212 73
Liabilities of directors (individual and firm) as payers	65,824 04
*Loans exceeding the limit prescribed by section 5200 of the Revised Statutes of the United States, viz:	35,000 00

GENERAL REMARKS.

The stocks and bonds owned by this bank other than United States bonds are as described in last report.

The real estate is as described in last report.

The books of individual deposit have not yet been balanced and show a slight discrepancy from the general ledger which is believed to be correct. This matter is under adjustment.

I learn unofficially—as the books do not so show—that the bank owns some $20,000 of discounted paper which is in New York, held by the Chemical National Bank, as security for a loan of that amount made on paper drawn by the directors of this bank, the proceeds of which loan went into the cash of this bank. This is offset by a real estate note $20,000 in my possession, and which had been charged off. If these notes $20,000, drawn by the directors, is paid by them, the discounted paper held by the Chemical National Bank will return to the assets of the bank.

The certified check account shows on the wrong side, because certain items have not been credited.

The general character of the paper seems to be good, but there will undoubtedly be some heavy losses, and these, on a rough approximation, I estimate at about $60,000.

B. U. KEYSER,
Examiner.

To the COMPTROLLER OF THE CURRENCY,
Washington, D. C.

[Inclosure No. 11.]

No. of bank, 52.

Examiner's report of the condition of the First National Bank, located at Newark, in the county of Essex, State of New Jersey, at 3 o'clock p. m., August 22, 1878.

RESOURCES.

1. Notes and bills discounted	$307,824 30
2. Overdrafts	16,447 07
3. United States bonds to secure circulation	500,000 00

*The law does not restrict loans on commercial or business paper, but only loans upon accommodation or other than business paper.

4. United States bonds to secure deposits			
5. United States bonds on hand			
6. Other stocks, bonds, and mortgages			
7. Due from approved reserve agents, viz:			
Third National Bank, New York	$161,916 32		
Central National Bank, New York	52,166 14		
Chatham National Bank, New York	31,010 47		
National Bank of Commonwealth of Boston	27,186 06		
National Bank of Northern Liberty, Philadelphia	14,386 56		
			266,665 55
8. Due from other national banks			98,706 59
9. Due from State banks and bankers			3,490 85
10. Banking house	$152,572 26		
11. Other real estate			
12. Furniture and fixtures			
			152,572 26
13. Current expenses	$1,432 53		
14. Taxes paid	2,876 47		
			4,309 00
15. Premiums paid			
16. Checks and other cash items			14,682 74
17. Exchanges for clearing-house, including gold checks			6,819 79
18. Bills of other national banks			12,023 00
19. Bills of State banks			
20. Fractional currency (including nickels)			
21. Specie, viz:			
Silver coin	$3,320 00		
Gold coin	171 72		
Gold Treasury notes			
			3,491 72
22. Legal-tender notes			355 00
23. United States certificates of deposit for legal tenders			
24. Five per cent. redemption fund with Treasurer United States			22,500 00
25. Other funds with Treasurer United States			19,916 32
Cash short			32 50
Total			1,464,981 69

LIABILITIES.

1. Capital stock paid in			$500,000 00
2. Surplus fund			58,050 41
3. Discount	$2,902 49		
4. Exchange	244 51		
5. Interest	164 28		
6. Premiums			
7. Profit and loss			
			3,311 28
8. Circulation received	$450,000 00		
On hand and returned			
			450,000 00
9. State bank circulation outstanding			
10. Dividends unpaid			668 00
11. Individual deposits, viz:			
Subject to check	$424,418 75		
Demand certificates			
Time certificates			
Certified checks			
Cashier's checks			
			424,418 75
12. United States deposits			
13. Deposits of United States disbursing officers			
14. Due to national banks			28,037 19
15. Due to State banks and bankers			496 06
16. Notes and bills rediscounted			
17. Bills payable			
Cash over			
Total			1,464,981 69

Records: Well kept.
Other books: Well kept.
President: The same as last year.
Cashier: The same as last year.
Directors: Nine.
Stockholders: One hundred and two.
Office: Corner Broad and Market streets.
Safe: Hall's safe and lock.

DIVIDENDS AND SURPLUS.

(Section 5199 of the Revised Statutes of the United States.)

Date of last dividend, July 1, 1878; amount, $20,000; carried to surplus, $1,019.53.

LOANS AND DISCOUNTS.

On paper with two or more individual or firm-names	$246,631 80
On single-name paper (one person or firm) without other security	28,580 00
On mortgages and other real-estate security according to law	20,000 00
On other stocks, bonds, &c., payable on demand	12,612 50
Included in the above are:	
Other suspended and overdue paper	$30,170 55
Liabilities of directors (individual and firm) as payers	23,580 00

GENERAL REMARKS.

About $5,000 of the overdrafts was made good on the 23d; the remainder will be gradually made good.
The cashier considers the suspended and overdue paper all good.
The law in regard to stamping checks is obeyed.

E. S. PECK,
F. C. CATE,
Examiners.

To the COMPTROLLER OF THE CURRENCY,
Washington, D. C.

[Inclosure No. 12.]

No. of bank, ——.

Examiner's report of the condition of the First National Bank, located at Newark, in the county of Essex, State of New Jersey, at 3 o'clock, p. m., September 1, 1879.

JABEZ COOK, *President.* J. A. HEDDEN, *Cashier.*

RESOURCES.

1. Notes and bills discounted		$189,049 41
2. Overdrafts		
3. United States bonds to secure circulation		300,000 00
4. United States bonds to secure deposits		
5. United States bonds on hand		
6. Other stocks, bonds, and mortgages		
7. Due from approved reserve agents, viz:		
Third National, New York	$12,882 73	
Central, New York	40,613 95	
Commonwealth, Boston	20,697 41	
		74,194 09
8. Due from other national banks		156,606 84
9. Due from State banks and bankers		10,721 56
10. Banking house		152,572 26
11. Other real estate		
12. Furniture and fixtures		
13. Current expenses	$1,290 77	
14. Taxes paid	3,081 21	
		4,371 98

15.	Premiums paid		
	Exchange		15 81
16.	Checks and other cash items		41,587 27
17.	Exchanges for clearing-house, including gold checks		
18.	Bills of other national banks		3,706 00
19.	Bills of State banks		
20.	Fractional currency (including nickels)		107 97
21.	Specie, viz:		
	Silver coin	$3,581 00	
	Gold coin	813 25	
	Gold Treasury notes		
			4,394 25
22.	Legal-tender notes		18,053 00
23.	United States certificates of deposit for legal-tenders		
24.	5 per cent. redemption fund with Treasurer of United States		13,500 00
25.	Other funds with Treasurer of United States		4,923 95
	Cash short		42 01
	Total		973,846 40

LIABILITIES.

1.	Capital stock paid in		$300,000 00
2.	Surplus fund		62,584 25
3.	Discount	$1,717 63	
4.	Exchange		
5.	Interest	244 74	
6.	Premiums		
7.	Profit and loss	4,533 84	
			6,496 21
8.	Circulation received		
	On hand and returned		270 000 00
9.	State bank circulation outstanding		
10.	Dividends unpaid		524 00
11.	Individual deposits, viz:		
	Subject to check		291,968 46
	Demand certificates		
	Time certificates		
	Certified checks		
	Cashier's checks		
12.	United States deposits		
13.	Deposits of United States disbursing officers		
14.	Due to national banks		19,507 52
15.	Due to State banks and bankers		2,289 15
16.	Notes and bills rediscounted		
17.	Bills payable		
	Suspense account		20,476 81
	Cash over		
	Total		973,846 40

Records and other books: Well kept.
President: Jabez Cook, owns 63 shares of stock.
Cashier: J. A. Hedden, the active business man of the bank.
Directors: Nine, owning 660 shares of the stock.
Stockholders: 103.
Office: Fine building, corner of Broad and Market streets.
Safe: Vault with safes inside.

DIVIDENDS AND SURPLUS.

(Section 5199 of the Revised Statutes of the United States.)

Date of last dividend, July 1, 1879; amount, $12,000, 4 per cent.

LOANS AND DISCOUNTS.

On paper with two or more individual or firm names	$166,072 28
On other stooks, bonds, &c., payable on demand	22,977 13
Included in the above are:	
Other suspended and overdue paper	$5,795 15
Liabilities of directors (individual and firm) as payers	24,300 00

GENERAL REMARKS.

This bank reduced capital stock on April 1, 1879, in the sum of $200,000, of which amount $100,000 was paid to the stockholders, and balance carried to suspense account, to which has been charged the whole amount of premium account ($42,969.12), and some $72,000 of bad debts, reducing surplus account from $100,000 to about $67,000, leaving it something over 20 per cent. of the present capital of the bank. The balance of suspense account will be credited to profit and loss, and used (together with amounts collected from bad debts charged off) to reduce item of real estate (bank building).

The small amount of overdue paper now held is in process of collection, and considered collectible.

The large amount of "cash items" consists of about $10,000. Exchange checks and balance, principally of drafts drawn by customers against shipments of grain for which bills of lading are held by the bank until the drafts are paid.

Law relative to stamped checks strictly complied with.

J. S. LANGWORTHY,
Examiner.

To the COMPTROLLER OF THE CURRENCY,
Washington, D. C.

[Inclosure No. 13.]

No. of bank, ——.

Examiner's report of the condition of the Mechanics' National Bank, located at Newark, in the county of Essex, State of New Jersey, at 9 o'clock a. m., August 14, 1879.

JOSEPH A. HALSEY, *President.* O. L. BALDWIN, *Cashier.*

RESOURCES.

1. Notes and bills discounted		$1,205,628 88
2. Overdrafts		819 71
3. United States bonds to secure circulation		500,000 00
4. United States bonds to secure deposits		
5. United States bonds on hand		
6. Other stocks, bonds, and mortgages		
7. Due from approved reserve agents, viz:		
Mechanics' National, New York		1,541,127 53
8. Due from other national banks		95,873 24
9. Due from State banks and bankers		32,306 86
10. Banking house	$25,000 00	
11. Other real estate		
12. Furniture and fixtures	5,500 00	
		30,500 00
13. Current expenses		
14. Taxes paid		
15. Premiums paid		
16. Checks and other cash items		11,829 67
17. Exchanges for clearing-house including gold checks		27,395 07
18. Bills of other national banks		34,240 00
19. Bills of State banks		
20. Fractional currency (including nickels)		671 35
21. Specie, viz:		
Silver coin	$13,304 53	
Gold coin	21,342 50	
Gold Treasury notes		
		34,647 03
22. Legal-tender notes		96,837 00
23. United States certificates of deposit for legal-tenders		
24. 5 per cent. redemption fund with Treasurer United States		22,500 00
25. Other funds with Treasurer United States		
Cash short		
Total		3,634,376 34

LIABILITIES.

1. Capital stock paid in		$500,000 00
2. Surplus fund		400,000 00
3. Discount	$4,486 62	
4. Exchange	1 23	
5. Interest		
6. Premiums		
7. Profit and loss	43,206 29	
		47,694 14
Suspense account		20,335 23
8. Circulation received		
On hand and returned		443,900 00
9. State bank circulation outstanding		
10. Dividends unpaid		16,061 50
11. Individual deposits, viz:		
Subject to check		2,141,027 04
Demand certificates		
Time certificates		
Certified checks		
Cashier's checks		
12. United States deposits		
13. Deposits of United States disbursing officers		
14. Due to national banks		52,103 76
15. Due to State banks and bankers		13,254 67
16. Notes and bills rediscounted		
17. Bills payable		
Cash over		
Total		3,634,376 34

Records: Complete.
Other books: Well kept.
President: Jos. A. Halsey; no business; 84 years old; owns 726 shares, par $50.
Cashier: Oscar L. Baldwin; good officer; stockholder, 20 shares.
Directors: Twelve; one vacancy.
Stockholders:
Office: Very good; worth $75,000.
Safe: Burglar-proof safes in vault.

DIVIDENDS AND SURPLUS.

(Section 5199 of the Revised Statutes of the United States.)

Date of last dividend, August 1, 1879, 7 per cent.; amount, $35,000.

LOANS AND DISCOUNTS.

On paper with two or more individual or firm names		$1,043,878 88
On single-name paper (one person or firm) without other security		125,000 00
On other stocks, bonds, &c., payable on demand		36,750 00
Included in the above are:		
Other suspended and overdue paper		40,371 00
Liabilities of directors (individual and firm) as payers		36,403 50

GENERAL REMARKS.

Suspended paper.—The following overdue paper Mr. Baldwin says is all good: S. H. Condict & Co., $5,000; D. M. Lyon and others, $6,951; C. Weedenmeyer, $1,500; Geo. Stengel, $1,500; W. M. Truesdell, $15,420; I. E. Bathgate & Son, $10,000. Total, $40,371.

ORSON ADAMS,
Examiner.

To the COMPTROLLER OF THE CURRENCY,
Washington, D. C.

[Inclosure No. 14.]

No. of bank, 1251.

Examiner's report of the condition of the Mechanics' National Bank, located at Newark, in the county of Essex, State of New Jersey, at 9 o'clock a. m., August 16, 1880.

JOSEPH A. HALSEY, *President.* OSCAR L. BALDWIN, *Cashier.*

RESOURCES.

1.	Notes and bills discounted		$1,257,184 36
2.	Overdrafts		5,200 05
3.	United States bonds to secure circulation		500,000 00
4.	United States bonds to secure deposits		
5.	United States bonds on hand		
6.	Other stocks, bonds, and mortgages		
7.	Due from approved reserve agents, viz:		
	The Mechanics' National Bank, New York		2,029,508 41
8.	Due from other national banks		175,189 69
9.	Due from State banks and bankers		25,850 11
10.	Banking house	$25,000	
11.	Other real estate	5,500	
12.	Furniture and fixtures		
			30,500 00
13.	Current expenses	$2,124 97	
14.	Taxes paid		
			2,124 97
15.	Premiums paid		
16.	Checks and other cash items		46,616 28
17.	Exchanges for clearing house, including gold checks		
18.	Bills of other national banks		29,547 00
19.	Bills of State banks		
20.	Fractional currency (including nickels)		91 49
21.	Specie, viz:		
	Silver coin	$5,403 33	
	Gold coin	23,506 00	
	Gold Treasury notes		
			28,909 33
22.	Legal-tender notes		238,459 00
23.	United States certificates of deposit for legal tenders		
24.	5 per cent. redemption fund with Treasury, United States		22,500 00
25.	Other funds with Treasurer United States		3,000 00
	Cash short		
	Total		4,394,680 69

LIABILITIES.

1.	Capital stock paid in		$500,000 00
2.	Surplus fund		400,000 00
3.	Discount	$5,711 08	
4.	Exchange		
5.	Interest		
6.	Premiums		
7.	Profit and loss	50,810 69	
			56,521 77
8.	Circulation received	$450,000 00	
	On hand and returned		
			450,000 00
9.	State bank circulation outstanding		558 00
10.	Dividends unpaid		13,548 50
11.	Individual deposits, viz:		
	Subject to check	$2,825,572 74	
	Demand certificates	7,000 00	
	Time certificates		
	Certified checks	36,097 07	
	Cashier's checks	7,596 08	
			2,876,265 89

12. United States deposits	
13. Deposits of United States disbursing officers	
14. Due to national banks	93,124 87
15. Due to State banks and bankers	3,662 08
16. Notes and bills rediscounted	
17. Bills payable	
Cash over	999 58
Total	4,394,680 69

Records: Show only three meetings of the board of directors since last previous examination, and only *one* of *these written up;* others are loose memoranda.

Other books: Of good and approved forms, and well kept.

President: Joseph A. Halsey; is eighty-six years old. Is an experienced and successful manager; has been in the board forty-three years; keeps a close watch over bank.

Cashier: Oscar L. Baldwin; has grown up from a boy in the bank; is a competent and efficient officer.

Directors: Thirteen in number. I was informed they meet weekly and look very closely after all the matters of the bank.

Stockholders: Three hundred and four; of whom 120 are women, and 20 are estates and trusts. The list is reputed very strong.

Office: Very good.

Safe: Very good.

DIVIDENDS AND SURPLUS.

(Section 5199 of the Revised Statutes of the United States.)

Date of last dividend, August 2, 1880; amount, $35,000.

LOANS AND DISCOUNTS.

On paper with two or more individual or firm names	$1,064,175 16
On single-name paper (one person or firm) without other security	59,559 20
On United States bonds payable on demand	2,500 00
On other stocks, bonds, &c., payable on demand	23,000 00
All other loans	107,950 00

Included in the above are:

Bad debts, as defined in section 5204 of the Revised Statutes of the United States	26,165 00
Other suspended and overdue paper	3,670 19
Liabilities of directors (individual and firm) as payers	107,950 00

* Loans exceeding the limit prescribed by section 5200 of the Revised Statutes of the United States, viz: not any.

GENERAL REMARKS.

The overdrafts, with the exception of W. N. Truesdale, $687.66, and which has been standing about fifteen months and of doubtful quality, are all recent and good; will probably soon disappear. The largest one slightly exceeds $3,000, and is the account of an estate of which the cashier is the executor. He assured me 't is good and will soon be arranged.

Of the amount due from other national banks, $14,790.46 is due from the First National Bank of Newark.

I verified account with Mechanics' National Bank of New York by obtaining its own balances and reconciling.

The "other real estate" consists of:

Vacant lots in city of Orange, N. J., taken to secure a debt, July 31, 1877; though unproductive they are represented to be good for $5,500.

The "bad debts" under section 5204 are:

C. W. Weidenmeyer, due May 14, 1875, collected by stock of the State Banking Company, have held, hoping stock will sell for enough to pay the debt	$1,500
C. Stengel, matured in July, 1875, and secured by same, collected as above	1,500
D. W. Lyons *et als.*, matured February 29, 1879, indulging, good	7,500
D. W. Lyons *et als.*, matured September 15, 1879, indulging, good	6,350

* The law does not restrict loans on commercial or business paper, but only loans upon accommodation or other than business paper.

W. N. Truesdale, matured February 9 and 15, 1879, collected by insurance stock, which is insufficient to pay the debt; promised to sell the collaterals and apply proceeds and charge off balance $9,070
Geo. H. Dodge, maker, deceased, hence the delay; note is good and will be paid; matured October 27, 1879 150
B. S. Dean, matured in October and December, 1879 (2 notes), will charge off. 95
21,165

The "other suspended," &c., consists of:

Four notes paid during this examination	$534 50	
Eight notes, all very recent maturity and good	2,010 69	
Dennis & Son, matured May 30, 1880, good for only 50 per cent.	1,125 00	
		$3,670 19

The cashier estimates a loss on all suspended paper of about $3,000.

Pay interest on 4 city accounts, at rate of 2½ per cent., amount of present balances $61,502.90.

I found one unstamped voucher; was informed this item in examinations was unusual.

Reserve always sufficient.

Do not practice re-discounting.

Have no bills payable.

Business very good; total cost of doing business slightly exceeds $45,000 per annum.

General management very good.

EDWD. H. SHELLEY,
Examiner.

To the COMPTROLLER OF THE CURRENCY,
Washington, D. C.

[Inclosure No. 15.]

NEWARK, *November* 1, 1881.

SIR: I have your telegram. I intended to write to you to-day. The telegrams of yesterday were received, and the instructions complied with. I am, with the assistance of Mr. Price, making an examination into the condition of The Mechanic's National Bank, Newark.

As I telegraphed you yesterday, the defalcation of the cashier has been carried on almost wholly through his New York bank account.

I should have caught him last year, but for a strange proceeding. Anticipating I would apply at the New York bank for the condition of his account, he went over to New York the day he presumed my letter would reach the bank, and made the bank a friendly, chatty visit, and while so visiting he learned in some way they were replying to my inquiries, and in a nonchalant and generous way informed them he was going right back to Newark and he would see me, and, if they wished, he would deliver their letter to me. From long acquaintance they did not suspect anything wrong, and confided the letter to his care. In some way he possessed himself of a blank letter-head, envelope, &c., and, after leaving the bank, wrote me a letter stating the balances, which, upon comparison, showed the amount to be approximately as stated by the books of his own bank, and signed Mr. Sharp's (the New York assistant cashier) name to the letter, and mailed the same to me. The letter was post-marked New York. I received the same by due course of mail.

So far as I have ascertained, I think that, after assessing for the whole $500,000 of capital stock, there will be a deficit of from $800,000 to $1,000,000.

I hope to send you my report to-morrow night.

Very respectfully,

EDWD. H. SHELLEY,
National Bank Examiner.

P. S.—I have some names suggested for receiver, against some of which there may be some objections, such as a personal interest in the way of claims. If anything is discovered in our examination I'll advise. The forged letter is still in my possession.

E. H. SHELLEY,
National Bank Examiner.

[Inclosure No. 16.]

NEWARK, N. J., *November* 5, 1881.

SIR: Please find herewith my report of the condition of The Mechanics' National Bank of Newark, on the morning of the 31st instant.

Soon after entering the bank on Monday morning (knowing its trouble, of course),

I received your telegram to take charge. I have, with the assistance of Mr. Price, been very thoroughly through the work.

The labor of examining into the eight years account of Messrs. Nugent & Co. will demand the time of an expert for several weeks. The receiver proposes to put one at the work soon. All the remedies, recoveries, investigations, &c., in that direction are committed to the United States District Attorney for the present.

When I was in Newark, in August, 1880, I did my work carefully and faithfully. Had it not been for the desperate act of forgery, I should have unearthed this dreadful calamity at that time.

I was very careful not only to follow the instructions of your circular letter, but was determined if any wrong existed to find it. If anywhere more than usual pains should be taken, I regarded this city the place. Though in the midst of the trouble during the whole of the week, and receiving at the hands of a wicked press severe and unjust treatment, I feel all the time that I can in conscious plainness say I faithfully discharged my duties to the good people of Newark in August, 1880. I now intend to visit Washington while in this State later in the month, or in December, when, of course, this case can be traversed by us carefully and fully. Any suggestions you please to make arising from it I shall be very glad to receive.

I intend to leave for home to night so as to be able to vote on Tuesday. After the 20th of the month, I propose to commence the rest of this State. In the mean time my address will be Rome, N. Y., as usual.

Very respectfully,

EDWARD H. SHELLEY,
National Bank Examiner.

Hon. JNO. J. KNOX,
Comptroller, &c., Washington, D. C.

[Inclosure No. 17.]

Statement of the receiver of the National Bank of the State of Missouri, June 23, 1877.

RESOURCES.

Bills receivable:			
Maturing local line		$824,807 98	
Exchange maturing		114,345 57	
Rediscounts		336,634 28	
Past due paper		2,233,112 96	
Suspended debt	$273,793 44		
Less amount over	1,130 05		
		272,663 39	
			$3,781,564 18
Overdrafts			35,981 94
Due from sundry banks			16,241 05
National Bank of Commerce, New York, gold		30,152 43	
National Bank of Commerce, New York, currency		183,158 66	
National Bank of Republic, New York, gold		16,220 00	
National Bank of Republic, New York, currency		194,524 74	
			424,055 83
Louisiana National Bank, New Orleans			116 10
London Joint Stock Bank, England, gold			103 74
Baring Brothers & Co., currency			6 00
Commercial Bank, Saint Louis, Mo			2,025 85
United States bonds to secure circulation			50,000 00
United States bonds to secure deposits			106,000 00
Other stocks and bonds			687,231 25
Real estate account		275,945 89	
Office furniture		6,000 00	
			281,945 89
Expense account		22,074 13	
Tax account		68,769 89	
			90,844 02
Cash		84,344 50	
Legal tenders and coin		145,000 00	
Mutilated currency		1,500 00	
United States revenue stamps		94 70	
Treasury United States resumption fund		2,250 00	
			233,189 20
			5,709,305 05

LIABILITIES.

Capital stock		$2,500,000 00
Undivided profits:		
Surplus fund	$248,775 52	
Contingent fund	1,125 91	
Profit and loss	19,691 12	
Income and expense account B No. 87	6,349 02	
Income and expense account B No. 1020 Olive street	1,890 78	
Income and expense account B Shepard property	251 90	
Old debt	2,672 44	
Suspense account	1,911 28	
		282,667 97
Deposits	719,665 09	
Due banks and bankers	855,096 66	
Treasurer city of Saint Louis account No. 2, currency	343,498 38	
Treasurer city of Saint Louis account No. 2, gold	43,212 50	
Demand certificates of deposit	10,896 40	
Time certificate of deposit	444,930 37	
Dividends unpaid 77° 1 70-19	9,641 50	
National Bank of Commerce, New York, 77°, 3	3,547 50	
		2,430,488 40
Wolflin indebtedness		14,654 40
Circulation		44,860 00
Rediscounts		336,634 28
Bills payable		100,000 00
		5,709,305 05

Statement of the National Bank of the State of Missouri, in Saint Louis, at the close of business June 14, 1877.

RESOURCES.

Discounts	$2,110,093 67	
Exchange maturing	482,772 90	
Bills receivable	205,128 64	
Suspended debt	67,534 75	
Past due paper	970,567 75	
		$3,836,097 71
Sundry stocks and bonds		688,731 25
U. S. bonds to secure circulation		50,000 00
U. S. bonds to secure deposits		106,000 00
U. S. bond account		32,568 75
National Bank of Commerce, New York, currency		182,834 81
National Bank of Commerce, New York, gold		26,159 98
National Bank Republic, New York, currency		242,166 84
National Bank Republic, New York, gold		17,540 00
Louisiana National Bank, New Orleans, La		358 87
London Joint Stock Bank, England, gold		749 35
Baring Bros. & Co., currency		6 00
Hilmers, McGowan & Co., New York, gold		3,848 00
Real estate		275,945 89
Expense account	22,044 43	
Tax account	68,769 89	
Office furniture	6,000 00	
		96,814 32
Overdrafts:		
Individual deposits, A to K	12,625 77	
Individual deposits, L to Z	14,391 07	
Foreign ledger	18,044 73	
		45,061 57
Cash	83,077 57	
Cash, legal tenders and coin	177,000 00	
Cash, United States revenue stamps	94 70	
		260,172 27
Treasurer United States, redemption fund		2,250 00
		5,867,305,61

Approximate valuation made by bank committee:	
Discounts, exchange, suspended debt, and past due paper, as good	$932,185 92
Bonds and stocks	242,143 00
United States bonds to secure circulation	50,000 00
United States bonds to secure deposits	106,000 00
Premium on United States bonds	17,160 00
United States bond account	32,568 75
Real estate	225,000 00
Overdrafts	43,889 59
Redemption fund, United States Treasury	2,250 00
United States internal revenue stamps	94 70
Office furniture	4,000 00
National Bank Commerce, New York, currency	182,834 81
National Bank Commerce, New York, gold	26,159 98
National Bank Republic, New York, currency	242,166 84
National Bank Republic, New York, gold	17,540 00
Louisiana National Bank, New Orleans	358 87
London Joint Stock Bank, England, gold	749 35
Baring Bros. & Co., currency	6 00
Hilmers, McGowan & Co., New York, gold	3,848 00
Cash currency and items	83,077 57
Legal tenders and coin	177,000 00
Valuation of all other paper than that classed as good above	718,819 92
Total valuation by committee	3,107,853 30
The committee should have added to this, as excess of United States bonds over circulation (W. S. J.)	5,140 00
	3,112,993 30

LIABILITIES.

Capital		$2,500,000 00
Undivided profits:		
Surplus fund	$248,775 52	
Contingent	1,125 91	
Profit and loss	19,396 40	
Income and express account, B No. 87	6,349 02	
Income and express account, B No. 1020	1,842 28	
Income and express account, Shepart property	251 90	
Suspense account	1,911 28	
Old debt	509 44	
		280,161 75
Deposits:		
Time certificates	444,745 95	
Demand certificates, currency	9,808 15	
Demand certificates, gold	2,060 00	
Treasurer city Saint Louis account No. 2, currency	391,188 12	
Treasurer city Saint Louis account No. 2, gold	44,532 50	
Individual deposits, A to K	474,018 86	
Individual deposits, L to Z	308,101 48	
Foreign accounts	915,670 88	
National Bank of Commerce, New York, No. 3	3,547 50	
Solon Humphreys, trustee	657 60	
Clearing house	4,947 82	
Dividends unpaid	9,641 50	
		2,608,920 36
Circulation	44,860 00	
Rediscounts	333,363 50	
Bills payable	100,000 00	
		5,867,305 61

Liabilities to creditors, including circulation, as ascertained by bank committee

Deposits:	
Current	$2,164,174 41
Time	444,745 95
Rediscounts	333,363 50
Bills payable	100,000 00
Circulation	44,860 00
Balance of resources over liabilities to creditors	25,849 44
	3,112,993 30

Taken from report of Jno. B. Henderson, H. S. Mills, and N. S. Choteau, committee of the board of directors National Bank State of Missouri, made June 19, 1877, on file in said bank.

WALTER S. JOHNSTON.
Receiver.

[Inclosure No. 18.]

Report of the condition of the National Bank of the State of Missouri, in Saint Louis, in the hands of receiver, for the quarter ending September 30, 1877.

ASSETS.

Assets at date of suspension, viz:		
Excess of bonds over circulation	$5,140 00	
Bills receivable (Schedule A)	3,494,831 12	
Other assets (Schedule B)	1,456,365 53	
Interest collected since suspension (Schedule C)	22,895 86	
Total assets		$4,979,232 51
Amount collected from assets to date (Schedule D)	678,691 48	
Offsets allowed and settled (Schedule E)	42,094 92	
Loss on promissory notes and other assets compounded or sold by order of court (Schedule F)	11,130 50	
Bills receivable on hand—estimated good (Schedule G) $252,167 71		
Bills receivable on hand—estimated doubtful 2,260,436 51		
Bills receivable on hand—estimated worthless 633,744 11		
	3,146,348 33	
Other assets (Schedule H)	1,100,967 28	
		4,979,232 51
(See schedules of above.)		

DISPOSITION OF COLLECTIONS.

Amount collected by receiver, as above, from assets	$678,691 48	
Amount collected by receiver from assessments upon stockholders		
		$678,691 48
Loans paid and other disbursements (Schedule I)	168,834 84	
Remitted to Comptroller of the Currency:		
Current funds $444,618 48		
Coin 14,542 00		
	459,160 48	
Legal expenses paid (Schedule J)	424 76	
All other expenses (Schedule K)	11,549 91	
Balance in hands of receiver	38,721 49	
		678,691 48

CLAIMS.

Amount of claims proved to date	$1,828,710 15
Amount of claims in dispute and contingent (Schedule L)	551,063 92
Liabilities not proved, as shown by the books	143,038 59

DIVIDENDS.

Amount dividend checks received from Comptroller (15 per cent)		$266 851 33
Amount dividend checks delivered	$262,463 36	
Amount dividend checks on hand	4,387 97	
		266,851 33

WALTER S. JOHNSTON,
Receiver.

[Inclosure No. 19.]

Report of the condition of the National Bank of the State of Missouri in Saint Louis in the hands of receiver, for the quarter ending December 31, 1877.

ASSETS.

Assets at date of suspension, viz:		
Excess of bonds over circulation		$5,140 00
Bills receivable (schedule with first report)		3,494,831 12
Other assets (Schedule A)		1,469,092 33
Premium, interest, &c., collected since suspension (Schedule B)	31,528 18	
Total assets		$5,000,591 63
Amount collected by receiver from assets to date (Schedule C)	741,441 46	
Amount collected by Comptroller—premiums, interest, &c		
Offsets allowed and settled (Schedule D)	44,992 92	
Loss on promissory notes and other assets compounded or sold by order of the court (Schedule E)	11,304 76	
Bills receivable on hand—estimated good Bills receivable on hand—estimated doubtful Bills receivable on hand—estimated worthless	3,097,983 27	
Other assets (Schedule F)	1,104,869 22	
		5,000,591 63

(See schedules of above.)

DISPOSITION OF COLLECTIONS.

Amount collected by receiver, as above, from assets (see schedule)			$741,441 46
Loans paid and other disbursements (see schedule) (Schedule G)		$171,355 08	
Remitted to Comptroller of the Currency:			
Current funds	$496,868 48		
Gold	14,542 00		
		511,410 48	
Legal expenses paid (Schedule H)		914 65	
Receiver's salary, paid to date			
All other expenses (Schedule J)		16,726 55	
Balance in hands of Comptroller			
Balance in hands of receiver		431,034 70	
			741,441 36

CLAIMS.

Amount of claims proved to date	$1,865,419 73
Amount of claims in dispute (see schedule), with report October 1, 1877	551,063 92
Liabilities not proved, as shown by the books	108 803 09

DIVIDENDS.

Amount dividend checks received from Comptroller (25 per cent.)		$457,065 63
Amount dividend checks delivered	$449,764 82	
Amount dividend checks on hand	7,300 81	
		457,065 63

WALTER S. JOHNSTON, *Receiver.*

[Inclosure No. 20.]

Report of the condition of the National Bank of the State of Missouri, in Saint Louis, in the hands of receiver, for the quarter ending March 31, 1878.

ASSETS.

Assets at date of suspension, viz:		
Excess of bonds over circulation		$5,140 00
Bills receivable (schedule with first report)		3,494,831 12
Other assets (schedule with first report, Schedule A)		1,472,847 68
Total assets at date of suspension		
Premium, interest, &c., collected since suspension (Schedule B)	39,154 52	
Total assets		$5,011,973 32
Amount collected by receiver from assets to date (Schedule C)	1,032,355 94	
Amount collected by Comptroller—premium, interest, &c.		
Offsets allowed and settled (Schedule D)	45,808 07	
Loss on promissory notes and other assets compounded or sold by order of court (Schedule E)	96,269 17	
Bills receivable on hand—estimated good Bills receivable on hand—estimated doubtful Bills receivable on hand—estimated worthless	2,942,646 12	
Other assets (Schedule F)	894,894 02	
		5,011,973 32

(See schedules of above.)

DISPOSITION OF COLLECTIONS.

Amount collected by receiver, as above, from assets (see schedule)		$1,032,355 94
Loans paid and other disbursements (Schedule G)	$274,649 63	
Remitted to Comptroller of the Currency:		
Current funds	$707,415 89	
Gold	15,167 00	
	722,58 89	
Legal expenses paid (Schedule H)	3,79 83	
All other expenses (Schedule J)	19,23 87	
Balance in hands of receiver	12,09 69	
		1,032,355 94

CLAIMS.

Amount of claims proved to date	$1,872,385 34
Amount of claims in dispute, and contingent (Schedule K)	499,988 70
Liabilities not proved, as shown by the books	104,915 67

DIVIDENDS.

Amount dividend checks received from Comptroller (35 per cent.)		$652,024 19
Amount dividend checks delivered	$637,401 63	
Amount dividend checks on hand	14,622 56	
		652,024 19

WALTER S. JOHNSTON,
Receiver.

[Inclosure No. 21.]

Report of the condition of the National Bank of the State of Missouri, in Saint Louis, in the hands of receiver, for the quarter ending June 29, 1878.

ASSETS.

Assets at date of suspension, viz:		
Excess of bonds over circulation	$5,140 00	
Bills receivable (schedule with first report)	3,514,831 12	
Other assets (schedule with first report)	1,503,718 38	
Total assets at date of suspension	5,023,689 50	
Premium, interest, &c., collected since suspension	45,526 61	
		$5,069,216 11
Amount collected by receiver from assets to date (see schedule)	1,033,410 18	
Amount collected by Comptroller—premium, interest, &c	42,806 70	
Offsets allowed and settled (see schedule)	46,736 70	
Loss on promissory notes and other assets compounded or sold by order of court (see schedule)	96,419 17	
Bills receivable on hand—estimated good, Bills receivable on hand—estimated doubtful, Bills receivable on hand—estimated worthless	2,914,692 02	
Other assets	935,151 34	
		5,069,216 11

(See schedules of above.)

DISPOSITION OF COLLECTIONS.

Amount collected by receiver, as above, from assets (see schedule)	$1,033,410 18	
Amount collected by Comptroller, as above	42,806 70	
Amount collected from assessments upon stockholders (see schedule)		
		$1,076,216 88
Loans paid, and other disbursements (see schedule)	312,057 88	
Dividends paid by Comptroller's checks	658,689 18	
Legal expenses paid (see schedule)	4,599 23	
All other expenses (see schedule)	14,756 80	
Balance in hands of Comptroller:		
Current funds	$48,726 71	
Gold	16,417 00	
	65,143 71	
Balance in hands of receiver	20,970 08	
		1,076,216 88

CLAIMS.

Amount of claims proved to date	$1,911,428 16
Amount of claims in dispute and contingent	479,988 76
Liabilities not proved, as shown by the books	88,581 00

DIVIDENDS.

Amount dividend checks received from Comptroller (35 per cent.)		$658,689 18
Amount dividend checks delivered	$646,997 95	
Amount dividend checks on hand	11,691 23	
		658,689 18

WALTER S. JOHNSTON,
Receiver.

[Inclosure No. 22.]

Report of the condition of the National Bank of the State of Missouri, in Saint Louis, in the hands of receiver, for the quarter ending October 1, 1878.

ASSETS.

Assets at date of suspension, viz:		
Excess of bonds over circulation	$5,140 00	
Bills receivable (schedule with first report)	3,514,831 12	
Other assets (schedule with first report)	1,503,718 38	
Total assets at date of suspension	5,023,689 50	
Premium, interest, &c., collected since suspension (schedule A)	54,203 81	
		$5,077,893 31
Amount collected by receiver from assets to date (see schedule B)	1,064,347 32	
Amount collected by Comptroller, premium, interest, &c. (schedule C)	43,431 70	
Offsets allowed and settled (see schedule)	46,736 70	
Loss on promissory notes and other assets compounded or sold by order of court (see schedule D)	101,819 17	
Bills receivable on hand, estimated good Bills receivable on hand, estimated doubtful Bills receivable on hand, estimated worthless	2,870,437 53	
Other assets "E"	951,120 89	
		5,077,893 31

(See schedules of above.)

DISPOSITION OF COLLECTIONS.

Amount collected by receiver, as above, from assets (see schedule)	$1,064,347 32	
Amount collected by Comptroller, as above	43,431 70	
Amount collected from assessments upon stockholders (see schedule)		
		1,107,779 02
Loans paid and other disbursements (see schedule F)	315,532 78	
Dividends paid by Comptroller's checks	665,711 64	
Legal expenses paid (see schedule G)	5,777 00	
Receiver's salary, paid to date		
All other expenses (see schedule H)	17,445 03	
Balance in hands of Comptroller:		
Current funds $81,704 25		
Gold 17,042 00		
	98,746 25	
Balance in hands of receiver	4,566 32	
		1,107,779 02

CLAIMS.

Amount of claims proved to date	$1,911,492 35
Amount of claims in dispute (see schedule) or contingent	467,988 70
Liabilities not proved, as shown by the books	88,518 75

DIVIDENDS.

Amount dividend checks received from Comptroller (35 per cent.)		$665,711 64
Amount dividend checks delivered	$650,533 99	
AAmount dividend checks on hand	15,177 65	
		665,711 64

WALTER S. JOHNSTON,
Receiver.

[Inclosure No. 23.]

Report of the condition of the National Bank of the State of Missouri, in Saint Louis, in the hands of receiver, for the quarter ending January 1, 1879.

ASSETS.

Assets at date of suspension, viz:		
Excess of bonds over circulation	$5,140 00	
Bills receivable (schedule with first report)	3,514,831 12	
Other assets (schedule with first report)	1,503,718 38	
Total assets at date of suspension	5,023,689 50	
Premium, interest, &c., collected since suspension	65,942 94	
		$5,089,182 44
Amount collected by receiver from assets to date (see schedule)	1,200,712 05	
Amount collected by Comptroller, premium, interest, &c.	44,056 70	
Offsets allowed and settled (see schedule)	46,736 70	
Loss on promissory notes and other assets compounded or sold by order of court (see schedule)	134,511 41	
Bills receivable on hand, estimated good Bills receivable on hand, estimated doubtful Bills receivable on hand, estimated worthless	2,881,293,27	
Other assets	781,872 31	
		5,089,182 44

(See schedules of above.)

DISPOSITION OF COLLECTIONS.

Amount collected by receiver, as above, from assets (see schedule)	$1,200,712 05	
Amount collected by Comptroller, as above	44,056 70	
Amount collected from assessments upon stockholders (see schedule)		
		$1,244,768 75
Loans paid and other disbursements, (see schedule)	324,560 80	
Dividends paid by Comptroller's checks	666,854 45	
Legal expenses paid (see schedule)	7,822 97	
Receiver's salary, paid to date		
All other expenses (see schedule)	19,391 73	
Balance in hands of Comptroller:		
Current funds $71,903 47		
Coin 17,667 00		
	89,570 47	
Balance in hands of receiver	136,568 33	
		1,244,768 75

CLAIMS.

Amount of claims proved to date	$1,914,757 52
Amount of claims in dispute (see schedule) and contingent	434,185 15
Liabilities not proved, as shown by the books	77,141 15

DIVIDENDS.

Amount dividend checks received from Comptroller (35 per cent.)		$666,854 45
Amount dividend checks delivered	$659,045 48	
Amount dividend checks on hand	7,808 97	
		666,854 45

WALTER S. JOHNSTON,
Receiver.

[Inclosure No. 24.]

Report of the condition of the National Bank of the State of Missouri, in Saint Louis, in the hands of receiver, for the quarter ending March 31, 1879.

ASSETS.

Assets at date of suspension, viz:		
Excess of bonds over circulation		$5,140 00
Bills receivable (schedule with first report, Schedule A)		3,516,331 12
Other assets (schedule with first report, Schedule B)		1,518,511 16
Total assets at date of suspension and additions since		5,039,982 28
Premium, interest, &c., collected since suspension (Schedule C)		68,264 09
		$5,108,246 37
Amount collected by receiver from assets to date (Schedule O)		1,245,154 11
Amount collected by Comptroller, premium, interest, &c. (Schedule E)		344,681 70
Offsets allowed and settled (Schedule D)		49,435 99
Loss on promissory notes and other assets compounded or sold by order of court (Schedule F)		630,983 73
Bills receivable on hand, estimated good	2,036,390 56	
Bills receivable on hand, estimated doubtful		
Bills receivable on hand, estimated worthless		
Other assets (Schedule G)		801,600 28
		5,108,246 37

(See schedules of above.)

DIPOSITION OF COLLECTIONS.

Amount collected by receiver, as above, from assets (see schedule)	$1,245,154 11	
Amount collected by Comptroller, as above	344,681 70	
		$1,589,835 81
Amount collected from assessments upon stockholders (see schedule)		
Loans paid and other disbursements (Schedule H)	340,904 28	
Dividends paid by Comptroller's checks	666,854 45	
Legal expenses paid (Schedule I)	8,740 47	
All other expenses (Schedule J)	21,781 88	
Balance in hands of Comptroller	526,763 80	
Balance in hands of receiver	24,790 93	
		1,589,835 81

CLAIMS.

Amount of claims proved to date	$1,914,757 52
Amount of claims in dispute (see schedule)	434,185 15
Liabilities not proved, as shown by the books	75,441 86

DIVIDENDS.

Amount dividend checks received from Comptroller (35 per cent.)		$666,854 45
Amount dividend checks delivered	$659,361 88	
Amount dividend checks on hand	7,492 57	
		$666,854 45

WALTER S. JOHNSTON,
Receiver.

[Inclosure No. 25.]

Report of the condition of the National Bank of the State of Missouri, in Saint Louis, in the hands of receiver, for the quarter ending June 30, 1879.

ASSETS.

Assets at date of suspension, viz:		
Excess of bonds over circulation		$5,140 00
Bills receivable (schedule with first report, Schedule A)		3,516,481 12
Other assets (schedule with first report, Schedule B)		1,529 160 17
Total assets at date of suspension, and additions since		5,050,781 29
Premium, interest, &c., collected since suspension (Schedule C)		72,894 03
		$5,123,675 32
Amount collected by receiver from assets to date (Schedule D)	1,404,510 27	
Amount collected by Comptroller, premium, interest, &c. (Schedule E)	345,306 70	
Offsets allowed and settled (Schedule D)	49,573 00	
Loss on promissory notes and other assets compounded or sold by order of court (see schedule)	630,983 73	
Bills receivable on hand, estimated good Bills receivable on hand, estimated doubtful Bills receivable on hand, estimated worthless	1,889,266 97	
Other assets (Schedule G)	804,034 65	
		5,123,675 32

(See schedules of above.)

DISPOSITION OF COLLECTIONS.

Amount collected by receiver, as above, from assets (see schedule)	$1,404,510 27	
Amount collected by Comptroller, as above	345,306 70	
		$1,749,816 97
Amount collected from assessments upon stockholders (see schedule)		
Loans paid and other disbursements (Schedule H)	351,761 75	
Dividends paid by Comptroller's checks	952,354 33	
Legal expenses paid (Schedule I)	9,843 70	
Receiver's salary, paid to date		
All other expenses (Schedule J)	23,791 08	
Balance in hands of Comptroller	267,688 92	
Balance in hands of receiver:		
Cash $28,851 68 115,524 51	144,376 19	
		1,749,816 97

CLAIMS.

Amount of claims proved to date	$1,914,671 12
Amount of claims in dispute (see schedule)	434,185 15
Liabilities not proved, as shown by the books	70,446 08

DIVIDENDS.

Amount dividend checks received from Comptroller (50 per cent.)		$952,364 33
Amount dividend checks delivered	$941,320 39	
Amound dividend checks on hand	11,033 04	

WALTER S. JOHNSTON,
Receiver.

[Inclosure No. 26.]

Report of the condition of the National Bank of the State of Missouri, in Saint Louis, in the hands of receiver, for the quarter ending September 30, 1879.

ASSETS.

Assets at date of suspension, viz:		
Excess of bonds over circulation		$5,140 00
Bills receivable (schedule with first report, Schedule A)		3,535,397 61
Other assets (schedule with first report, Schedule B)		1,532,176 47
Total assets at date of suspension, and additions since		5,072,714 08
Premium, interest, &c., collected since suspension (Schedule C)		91,089 49
		$5,163,803 57
Amount collected by receiver from assets to date (Schedule D)		1,676,684 66
Amount collected by Comptroller, premium, interest, &c. (Schedule E)		345,931 70
Offsets allowed and settled (Schedule D)		184,395 96
Loss on promissory notes and other assets compounded or sold by order of court (see Schedule F)		629,933 73
Bills receivable on hand, estimated good	$65,727 80	
Bills receivable on hand, estimated doubtful	301,661 44	
Bills receivable on hand, estimated worthless	1,302,379 69	
		1,669,768 93
Other assets—good, $108,155; doubtful, $———; worthless, $548,983.59. (Schedule G)		657,088 59
		5,163,803 57

(See schedules of above.)

DISPOSITION OF COLLECTIONS.

Amount collected by receiver, as above, from assets (see schedule)	$1,676,684 66	
Amount collected by Comptroller, as above	345,931 70	
		$2,022,616 36
Amount collected from assessments upon stockholders (see schedule)		
Loans paid and other disbursements (Schedule H)	606,797 82	
Dividends paid by Comptroller's checks	1,334,394 95	
Legal expenses paid (Schedule J)	9,882 70	
Receiver's salary, paid to date		
All other expenses (Schedule K)	25,714 88	
Balance in hands of Comptroller	11,314 83	
Balance in hands of receiver	34,511 18	
		2,022,616 36

CLAIMS.

Amount of claims proved to date (Schedule L)	$1,887,604 34	
Amount of claims in dispute (see schedule)		
Liabilities not proved, as shown by the books (Schedule M)	15,021 57	

DIVIDENDS.

Amount dividend checks received from Comptroller (—per cent.)		$1,334,394 95
Amount dividend checks delivered	$1,310,021 71	
Amount dividend checks on hand	24,373 24	
		1,334,394 95

WALTER S. JOHNSTON,
Receiver.

[Inclosure No. 27.]

Report of the condition of the National Bank of the State of Missouri, in Saint Louis, n the hands of receiver, for the quarter ending December 31, 1879.

ASSETS.

Assets at date of suspension, viz:		
Excess of bonds over circulation		$5,140 00
Bills receivable (schedule with first report, Schedule A)		3,541,251 51
Other assets (schedule with first report Schedule B)		1,532,532 22
Total assets at date of suspension and additions since		5,078,923 73
Premium, interest, &c., collected since suspension (Schedule C)	96,352 87	
		$5,175,276 60
Amount collected by receiver from assets to date (Schedule D)	1,743,623 36	
Amount collected by Comptroller—premium, interest, &c. (Schedule E)	346,556 70	
Offsets, allowed and settled (see schedule)	184,395 96	
Loss on promissory notes and other assets compounded or sold by order of court (see Schedule F)	629,168 73	
Bills receivable on hand, estimated worthless	1,639,553 20	
Other assets (G)	631,978 65	
		5,175,276 60

(See schedules of above.)

DISPOSITION OF COLLECTIONS.

Amount collected by receiver, as above, from assets (see schedule)	$1,743,623 36	
Amount collected by Comptroller, as above	346,556 70	
Amount collected from assessments upon stockholders (Schedule H)	37,492 19	
		$2,127,672 25
Loans paid and other disbursements (Schedule I)	613,142 97	
Dividends paid by Comptroller's checks	1,437,396 87	
Legal expenses paid (Schedule J)	22,151 37	
Receiver's salary, paid to date		
All other expenses (Schedule R)	27,748 33	
Balance in hands of Comptroller	10,455 14	
Balance in hands of receiver	16,777 60	
		2,127,672 25

ASSESSMENTS.

Amount of assessments on stockholders, 25 per cent. on $2,040,100		$510,025 00
Amount of assessments paid by stockholders	$38,717 19	
(See Schedule L.)		

CLAIMS.

Amount of claims proved to date (Schedule M)	$1,888,242 24
Amount of claims in dispute (see schedule)	
Liabilities not proved, as shown by the books (Schedule N)	14,383 67

DIVIDENDS.

Amount dividend checks received from Comptroller, (75 per cent.)		$1,437,396 84
Amount dividend checks delivered	$1,412,361 13	
Amount dividend checks on hand	25,035 71	
		1,437,396 84

WALTER S. JOHNSTON,
Receiver.

[Inclosure No. 28.]

Report of the condition of the National Bank of the State of Missouri, in Saint Louis, in the hands of receiver, for the quarter ending March 31, 1880.

ASSETS.

Assets at date of suspension, viz:		
Excess of bonds over circulation	$5,140 00	
Bills receivable (schedule with first report), Schedule A)	3,546,683 51	
Other assests (schedule with first report), (Schedule B)	1,560,645 05	
Total assets at date of suspension and additions since	5,112,468 56	
Premium, interest, &c., collected since suspension (Schedule C)	101,873 63	
		$5,214,342 19
Amount collected by receiver from assets to date (Schedule D)	1,813,948 63	
Amount collected by Comptroller—premium, interest, &c. (Schedule E)	347,181 70	
Offsets allowed and settled (Schedule F)	185,015 54	
Loss on promissory notes and other assets compounded or sold by order of court (see Schedule G)	629,214 93	
Bills receivable on hand, estimated good	1,610,026 31	
Bills receivable on hand, estimated doubtful		
Bills receivable on hand, estimated worthless		
Other assets (Schedule H)	628,955 08	
		5,214,342 19

(See schedules of above.)

DISPOSITION OF COLLECTIONS.

Amount collected by receiver, as above, from assets (see schedule)	$1,813,948 63	
Amount collected by Comptroller, as above	347,181 70	
Amount collected from assessments upon stockholders (Schedule I)	141,450 00	
		$2,302,580 33
Loans paid and other disbursements (Schedule J)	647,374 97	
Dividends paid by Comptroller's checks	1,437,396 84	
Legal expenses paid (Schedule K)	23,061 62	
Receiver's salary, paid to date		
All other expenses (Schedule L)	36,119 72	
Balance in hands of Comptroller	148,505 14	
Balance in hands of receiver	10,122 04	
		2,302,580 33

ASSESSMENTS.

Amount of assessments on stockholders 25 per cent., on $2,040,100, (Schedule M)		$510,025 00
Amount of assessments paid by stockholders (Schedule N)	$142,675 00	

(See schedule.)

CLAIMS.

Amount of claims proved to date (Schedule O)	$1,885,763 95
Amount of claims in dispute (see schedule)	
Liabilities not proved, as shown by the books (schedule)	14,373 67

DIVIDENDS.

Amount divided checks received from Comptroller (75 per cent.)		$1,437,396 84
Amount dividend checks delivered	$1,433,730 47	
Amount dividend checks on hand	3,666,37	
		1,437,396 84

WALTER S. JOHNSTON,
Receiver.

[Inclosure No. 29.]

Report of the condition of the National Bank of the State of Missouri, in Saint Louis, in the hands of receiver, for the quarter ending June 30, 1880.

ASSETS.

Assets at date of suspension, viz:		
Excess of bonds over circulation	$5,140 00	
Bills receivable (schedule with first report, Schedule A.)	3,554,174 99	
Other assets (schedule with first report, Schedule B)	1,565,250 65	
Total assets at date of suspension, and additions since	5,124,565 64	
Premium, interest, &c., collected since suspension (Schedule C)	112,914 10	
		$5,237,479 74
Amount collected by receiver from assets to date (Schedule D)	1,917,354 69	
Amount collected by Comptroller, premium, interest, &c. (Schedule E)	347,806 70	
Offsets allowed and settled (see schedule)	185,015 54	
Loss on promissory notes and other assets compounded or sold by order of the court (see Schedule F)	623,964 01	
Bills receivable on hand, estimated good Bills receivable on hand, estimated doubtful Bills receivable on hand, estimated worthless	1,540,138 12	
Other assets (Schedule G)	623,200 68	
		5,237,429 74

(See schedules of above.)

DISPOSITION OF COLLECTIONS.

Amount collected by receiver, as above, from assets (see schedule)	$1,917,354 69	
Amount collected by Comptroller, as above	347,806 70	
Amount collected by Comptroller from assessments upon stockholders (Schedule H)	183,825 00	
		$2,448,986 39
Loans paid and other disbursements (Schedule I)	668,350 72	
Dividends paid by Comptroller's checks	1,531,001 84	
Legal expenses paid (Schedule J)	24,541 12	
Receiver's salary, paid to date		
All other expenses (Schedule K)	42,050 61	
Balance in hands of Comptroller	81,620 45	
Balance in hands of receiver	101,421 65	
		2,448,986 39

ASSESSMENTS.

Amount of assessments on stockholders		$510 025 00
Amount of assessments paid by stockholders (Schedule L)	$1,900,050 00	

(See schedule.)

CLAIMS.

Amount of claims proved to date (Schedule M)	$1,866,159 81
Liabilities not proved, as shown by the books (Schedule N)	13,987 81

DIVIDENDS.

Amount dividend checks received from Comptroller (80 per cent.)		$1,531,001 84
Amount dividend checks delivered	$1,524,847 96	
Amount dividend checks on hand	6,153 88	
		1,531,001 84

WALTER S. JOHNSTON,
Receiver.

[Inclosure No. 30.]

Report of the condition of the National Bank of the State of Missouri, in Saint Louis, in the hands of receiver, for the quarter ending September 30, 1880.

ASSETS.

Assets at date of suspension, viz:		
Excess of bonds over circulation	$5,140 00	
Bills receivable (schedule with first report), (A)	3,565,815 44	
Other assets (schedule with first report), (B)	1,565,774 75	
Total assets at date of suspension	5,136,730 19	
Premium, interest, &c., collected since suspension (C)	115,615 34	
		$5,252,345 53
Amount collected by receiver from assets to date (see Schedule D)	$1,934,263 49	
Amount collected by Comptroller, premium, interest, &c. (E)	348,431 70	
Offsets allowed and settled (see Schedule F)	185,648 21	
Loss on promissory notes and other assets compounded or sold by order of court (see schedule)	623,964 01	
Bills receivable on hand, estimated good Bills receivable on hand, estimated doubtful Bills receivable on hand, estimated worthless	1,543,381 32	
Other assets (G)	616,656 80	
		5,252,345 53

(See schedules of above.)

DISPOSITION OF COLLECTIONS.

Amount collected by receiver as above, from assets (see schedule)	$1,934,263 49	
Amount collected by Comptroller, as above	348,431 70	
Amount collected from assessments upon stockholders (see Schedule H)	209,471 91	
		$2,492,167 10
Loans paid, and other disbursements (see Schedule I)	680,558 00	
Dividends paid by Comptroller's checks	1,623,446 17	
Legal expenses paid (see Schedule J)	25,134 37	
Receiver's salary, paid to date	30,000 00	
All other expenses (see Schedule K)	46,645 56	
Balance in hands of Comptroller	29,289 12	
Balance in hands of receiver	2,093 88	
		2,492,167 10

ASSESSMENTS.

Amount of assessments on stockholders		$510,025 00
Amount of assessments paid by stockholders (L) (See schedule.)	$219,695 00	

CLAIMS.

Amount of claims proved to date (M)	$1,847,583 67
Liabilities not proved, as shown by the books (N)	22,648 74

DIVIDENDS.

Amount (—per cent.) dividend checks received from Comptroller		$1,623,446 17
Amount dividend checks delivered	$1,619,479 95	
Amount dividend checks on hand	3,966 22	

WALTER S. JOHNSTON,
Receiver.

[Inclosure No. 31.]

Report of the condition of the National Bank of the State of Missouri, in Saint Louis, in the hands of receiver, for the quarter ending December 31, 1880.

ASSETS.

Assets at date of suspension, viz:		
Excess of bonds over circulation		$5,140 00
Bills receivable (schedule with first report, Schedule A)	3,566,015 44	
Other assets (schedule with first report, Schedule B)	1,566,119 90	
Total assets at date of suspension and additions since	5,137,275 34	
Premium, interest, &c., collected since suspension (Schedule C)	154,095 61	
		$5,291,370 95
Amount collected by receiver from assets to date (Schedule D)	2,039,898 95	
Amount collected by Comptroller, premium, interest, &c. (Schedule E)	349,056 70	
Offsets allowed and settled (Schedule F)	185,710 39	
Loss on promissory notes and other assets compounded or sold by order of court (see Schedule G)	633,297 34	
Bills receivable on hand, estimated good; Bills receivable on hand, estimated doubtful; Bills receivable on hand, estimated worthless	1,486,694 62	
Other assets (see Schedule H)	596,712 95	
		5,291,370 95

(See schedules of above.)

DISPOSITION OF COLLECTIONS.

Amount collected by receiver, as above, from assets (see schedule)	$2,039,898 95	
Amount collected by Comptroller, as above	349,056 70	
Amount collected from assessments upon stockholders (Schedule I)	214,200 49	
		$2,603,156 14
Loans paid and other disbursements (Schedule J)	681,792 38	
Dividends paid by Comptroller's checks	1,807,918 42	
Legal expenses paid (Schedule K)	27,287 67	
Receiver's salary, paid to date	30,000 00	
All other expenses (Schedule L)	48,290 41	
Balance in hands of Comptroller	294 92	
Balance in hands of receiver	7,567 34	
		2,603,156 14

ASSESSMENTS.

Amount of assessments on stockholders		$510,025 00
Amount of assessments paid by stockholders (Schedule M). (See schedule.)	$224,995 00	

CLAIMS.

Amount of claims proved to date (Schedule N)	$1,841,869 47
Liabilities not proved, as shown by the books (Schedule O)	22,586 56

DIVIDENDS.

Amount dividend checks received from Comptroller (95 per cent.)		$1,807,918 42
Amount dividend checks delivered	$1,799,903 88	
Amount dividend checks on hand	8,014 54	

WALTER S. JOHNSTON,
Receiver.

[Inclosure No. 32.]

Report of the condition of the National Bank of the State of Missouri, in Saint Louis, in the hands of receiver, for the quarter ending March 31, 1881.

ASSETS.

Assets at date of suspension, viz:		
Excess of bonds over circulation		$5,140 00
Bills receivable (schedule with last report)		3,566,015 44
Other assets (schedule with first report, Schedule A)		1,569,848 91
Total assets at date of suspension and additions since		5,141,004 35
Premium, interest, &c., collected since suspension (Schedule B)	155,796 72	
		$5,296,801 07
Amount collected by receiver from assets to date (Schedule C)	2,046,228 56	
Amount collected by Comptroller, premium, interest, &c. (Schedule D)	349,681 70	
Offsets allowed and settled (see schedule),	185,710 39	
Loss on promissory notes and other assets compounded or sold by order of court (see schedule)	633,297 34	
Bills receivable on hand, estimated good, Bills receivable on hand, estimated doubtful, Bills receivable on hand, estimated worthless	1,481,478 62	
Other assets (Schedule E)	600,404 46	
		5,296,801 07

(See schedules of above.)

DISPOSITION OF COLLECTIONS.

Amount collected by receiver, as above, from assets (see schedule)	$2,046,228 56	
Amount collected by Comptroller, as above	349,681 70	
Amount collected from assessments upon stockholders (Schedule F)	214,625 49	
		$2,610,535 75
Loans paid and other disbursements (Schedule G)	685,526 39	
Dividends paid by Comptroller's checks	1,807,918 42	
Legal expenses paid (Schedule H)	27,683 02	
Receiver's salary, paid to date	30,000 00	
All other expenses (Schedule I)	53,994 72	
Balance in hands of Comptroller	669 92	
Balance in hands of receiver	4,743 28	
		2,610,535 75

ASSESSMENTS.

Amount of assessments on stockholders		$510,025 00
Amount of assessments paid by stockholders (Schedule J)	$225,420 00	

(See schedule.)

CLAIMS.

Amount of claims proved to date	$1,841,869 47
Amount of claims in dispute (see schedule)	
Liabilities not proved, as shown by the books	22,586 56

DIVIDENDS.

Amount dividend checks received from Comptroller (95 per cent.)		$1,807,918 42
Amount dividend checks delivered	$1,804,925 43	
Amount dividend checks on hand	2,992 99	

WALTER S. JOHNSTON,
Receiver.

[Inclosure No. 33.]

Report of the condition of the National Bank of the State of Missouri, in Saint Louis, in the hands of receiver, for the quarter ending June 30, 1881.

ASSETS.

Assets at date of suspension, viz:		
Excess of bonds over circulation	$5,140 00	
Bills receivable (schedule with first report)	3,566,015 44	
Other assets (schedule with first report, Schedule A)	1,623,569 76	
Total assets at date of suspension	5,194,725 20	
Premium, interest, &c., collected since suspension (Schedule B)	165,795 29	
		$5,360,520 49
Amount collected by receiver from assets to date (Schedule C)	2,112,619 62	
Amount collected by Comptroller—premium, interest, &c., (Schedule D)	351,007 04	
Offsets allowed and settled (see schedule)	185,710 39	
Loss on promissory notes and other assets compounded or sold by order of court (see schedule)	633,297 34	
Bills receivable on hand—estimated good Bills receivable on hand—estimated doubtful Bills receivable on hand—estimated worthless	1,423,910 29	
Other assets (Schedule E)	653,975 31	
(See schedules of above.)		
		5,360,520 49

DISPOSITION OF COLLECTIONS.

Amount collected by receiver, as above, from assets (see schedule)	$2,112,619 62	
Amount collected by Comptroller, as above	351,007 04	
Amount collected from assessments upon stockholders (Schedule F)	219,000 49	
		$2,682,627 15
Loans paid and other disbursements (Schedule G)	739,415 34	
Dividends paid by Comptroller's checks	1,807,994 42	
Legal expenses paid (Schedule H)	28,657 10	
Receiver's salary, paid to date	30,000 00	
All other expenses (Schedule I)	55,776 66	
Balance in hands of Comptroller	1,916 96	
Balance in hands of receiver	18,866 67	
		2,682,627 15

ASSESSMENTS.

Amount of assessments on stockholders		$510,025 00
Amount of assessments paid by stockholders (Schedule J). (See schedule.)	$229,795 00	

CLAIMS.

Amount of claims proved to date (Schedule K)		$1,841,949 47
Liabilities not proved, as shown by the books (Schedule L)	$22,506 56	

DIVIDENDS.

Amount dividend checks received from Comptroller (— per cent.)	$1,807,994 42
Amount dividend checks delivered	1,806,091 65
Amount dividend checks on hand	1,902 77

WALTER S. JOHNSTON,
Receiver.

[Inclosure No. 34.]

Report of the condition of the National Bank of the State of Missouri, in Saint Louis, in the hands of receiver, for the quarter ending September 30, 1881.

ASSETS.

Assets at date of suspension, viz:		
Excess of bonds over circulation		$5,140 00
Bills receivable (Schedule with first report)		3,566,015 44
Other assets (Schedule with first report)		1,623,569 76
Total assets at date of suspension and additions since		5,194,725 20
Premium, interest, &c., collected since suspension (Schedule A)		166,751 43
		$5,361,476 63
Amount collected by receiver from assets to date (schedule B)	2,117,104 50	
Amount collected by Comptroller—premium, interest, &c	351,007 04	
Offsets allowed and settled (Schedule C)	185,715 33	
Loss on promissory notes and other assets compounded or sold by order of court (see schedule)	633,297 34	
Bills receivable on hand, estimated good	1,420,960 79	
Bills receivable on hand, estimated doubtful		
Bills receivable on hand, estimated worthless		
Other assets (Schedule D)	653,391 63	
		5,361,476 63

(See schedules of above.)

DISPOSITION OF COLLECTIONS.

Amount collected by receiver, as above, from assets (see schedule)		$2,117,104 50
Amount collected by Comptroller, as above	351,007 04	
Amount collected from assessments upon stockholders (see Schedule E)	219,525 49	
		$2,687,637 03
Loans paid and other disbursements (see schedule)	739,415 34	
Dividends paid by Comptroller's checks	1,807,994 42	
Legal expenses paid (see schedule)	28,657 10	
Receiver's salary, paid to date	30,000 00	
All other expenses (Schedule F)	57,143 44	
Balance in hands of Comptroller	1,916 96	
Balance in hands of receiver	*22,509 77	
		2,687,637 03

ASSESSMENTS.

Amount of assessments on stockholders		$510,025 00
Amount of assessments paid by stockholders (Schedule G)	$230,320 00	

(See schedule.)

CLAIMS.

Amount of claims proved to date		$1,841,949 47
Liabilities not proved, as shown by the books, (Schedule H)	$22,501 62	

DIVIDENDS.

Amount dividend checks received from Comptroller (95 per cent.)		$1,807,994 42
Amount dividend checks delivered	$1,805,091 65	
Amount dividend checks on hand	1,902 77	

WALTER S. JOHNSTON,
Receiver.

* $20,000 of this amount remitted to Comptroller of the Currency and deposited with Treasurer United States, November 29, 1881

[Inclosure No. 35.]

GERMAN-AMERICAN NATIONAL BANK,
Washington, D. C., November 15, 1878.

DEAR JOHN: The statement of actual values of assets and liabilities of this bank is as follows, and is the result of careful consideration:

Liabilities:		
To depositors	$252,325 38	
To other banks	11,309 25	
	263,634 63	
To this may be added amount of notes discounted for account of bank.	30,000 00	
	293,634 63	
Assets, probable value:		
Real estate	$129,000 00	
Loans and discount	145,000 00	
Bonds on hand, say	2,500 00	
Overdrafts	5,000 00	
Premiums, say	1,000 00	
United States bonds, circulation	7,000 00	
Five per cent. redemption fund	1,350 00	
Cash items	3,523 00	
		$294,373 00

In addition I have, in a very peculiar account called No. 753, cash balance to credit, $496.69.

Notes in process of collection, owned by the bank, and in this account, about $13,000. These notes are in the hands of Dr. Prentis and will be handed to me.

This comprises a succinct and reasonable view of the assets and liabilities, as I view them now. Subsequent investigations may vary my estimate slightly, but not to any extent.

From this you may collate for publication, or authorize me, and the papers shall have it to-day.

Yours, &c., B. U. KEYSER.

[Inclosure No. 36.]

Report of the condition of the German-American National Bank, in the hands of receiver, for the quarter ending December 31, 1878.

ASSETS.

Assets at date of suspension, viz:			
Excess of bonds over circulation		$7,000 00	
Bills receivable (schedule with first report)		235,443 71	
Other assets (schedule with first report)		190,779 56	
Total assets at date of suspension			433,223 27
Premium, interest, &c., collected since suspension			$2,753 13
			435,976 40
Amount collected by receiver from assets to date (see schedule)		13,985 53	
Amount collected by Comptroller—premium, interest, &c		357 70	
Offsets allowed and settled (see schedule)		5,768 49	
Loss on promissory notes and other assets compounded or sold by order of court (see schedule)			
Bills receivable on hand, estimated good	$87,068 68		
Bills receivable on hand, estimated doubtful	112,089 77		
Bills receivable on hand, estimated worthless	25,486 96		
		224,645 41	
Other assets: Good, $151,358.35; doubtful, $27,424.66; worthless, $12,436.26		191,219 27	
			435,976 40

(See schedules of above.)

DISPOSITION OF COLLECTIONS.

Amount collected by receiver, as above, from assets (see schedule)	$13,985 53	
Amount collected by Comptroller, as above	357 70	
Amount collected from assessments upon stockholders (see schedule)		
		$14,343 23
Loans paid and other disbursements (see schedule)	4,927 90	
Dividends paid by Comptroller's checks		
Legal expenses paid (see schedule)		
Receiver's salary, paid to date	450 00	
All other expenses (see schedule)	1,065 73	
Balance in hands of Comptroller	5,649 74	
Balance in hands of receiver	2,249 86	
		14,343 23

CLAIMS.

Amount of claims proved to date, credit balance	$176,268 24
Amount of claims, drafts	2,622 80
Liabilities not proved, as shown by the books	75,643 93

B. U. KEYSER,
Receiver.

[Inclosure No. 37.]

Report of the condition of the German-American National Bank, in the hands of receiver, for the quarter ending March 31, 1879.

ASSETS.

Assets at date of suspension, viz:		
Excess of bonds over circulation	$7,000 00	
Bills receivable (schedule with first report)	235,443 71	
Other assets (schedule with first report)	190,779 56	
Total assets at date of suspension		$433,223 27
Premium, interest, &c., collected since suspension		7,178 50
		440,401 77
Amount collected by receiver from assets to date (see schedule)	20,502 15	
Amount collected by Comptroller, premium, interest, &c.	1,082 70	
Offsets allowed and settled (see schedule)	10,026 97	
Loss on promissory notes and other assets compounded or sold by order of court (see schedule)	150 00	
Bills receivable on hand, estimated good	$83,021 23	
Bills receivable on hand, estimated doubtful	102,348 75	
Bills receivable on hand, estimated worthless	25,486 96	
	210,856 94	
Other assets:		
Good	155,120 02	
Doubtful	31,430 29	
Worthless	11,232 70	
	197,783 01	
		440,401 77

(See schedules of above.)

DISPOSITION OF COLLECTIONS.

Amount collected by receiver, as above, from assets (see schedule)	$20,502 15	
Amount collected by Comptroller, as above	1,082 70	
Amount collected by assessments upon stockholders (see schedule)		
		$21,584 85

Loans paid and other disbursements, (see schedule)	$8,266 81	
Dividends paid by Comptroller's checks		
Legal expenses paid (see schedule)	333 03	
Receiver's salary, paid to date	675 00	
All other expenses (see schedule)	1,780 89	
Balance in hands of Comptroller	8,874 74	
Balance in hands of receiver	1,654 38	
		$21,584 85

CLAIMS.

Amount of claims proved to date	$252,694 96
Liabilities not proved, as shown by the books	22,886 32

B. U. KEYSER,
Receiver.

[Inclosure No. 38.]

Report of the condition of the German-American National Bank, in the hands of receiver, for the quarter ending June 30, 1879.

ASSETS.

Assets at date of suspension, viz:		
Excess of bonds over circulation	$7,000 00	
Bills receivable (schedule with first report)	235,443 71	
Other assets (schedule with first report)	190,779 56	
Total assets at date of suspension		$433,223 27
Premium, interest, &c., collected since suspension		11,098 21
		444,321 48
Amount collected by receiver from assets to date (see schedule)	$31,717 00	
Amount collected by Comptroller, premium, interest, &c	1,582 70	
Offsets allowed and settled (see schedule)	29,332 27	
Loss on promissory notes and other assets compounded or sold by order of court (see schedule)	10,156 09	
Bills receivable on hand, estimated good	$71,169 14	
Bills receivable on hand, estimated doubtful	96,755 64	
Bills receivable on hand, estimated worthless	14,669 78	
	182,594 56	
Other assets: Good, $146,275.87; doubtful, $31,430.29; worthless, $11,232.70	188,938 86	
		$444,321 48

(See schedules of above.)

DISPOSITION OF COLLECTIONS.

Amount collected by receiver, as above, from assets (see schedule)	$31,717 00	
Amount collected by Comptroller, as above	1,582 70	
Amount collected by sale of $20,000 United States bonds, April 30	21,275 00	
		$54,574 70
Loans paid and other disbursements (see schedule)	11,000 44	
Dividends paid by Comptroller's checks	23,393 48	
Legal expenses paid (see schedule)	338 13	
Receiver's salary, paid to date, to June 1	1,575 00	
All other expenses (see schedule)	2,101 35	
Balance in hands of Comptroller and United States Treasurer	14,756 26	
Balance in hands of receiver	1,410 04	
		54,574 70

CLAIMS.

Amount of claims proved to date	$259,396 41
Liabilities not proved, as shown by the books	16,179 87

DIVIDENDS.

Amount dividend checks received from Comptroller (10 per cent.)	$23,393 48
Amount dividend checks delivered	22,277 96
Amount dividend checks on hand	1,115 52

B. U. KEYSER,
Receiver.

[Inclosure No. 39.]

Report of the condition of the German-American National Bank, in the hands of receiver, for the quarter ending September 30, 1879.

ASSETS.

Assets at date of suspension, viz:		
Excess of bonds over circulation	$7,000 00	
Bills receivable (schedule with first report)	235,443 71	
Other assets (schedule with first report)	190,779 56	
Total assets at date of suspension		$433,223 27
Premium, interest, &c., collected since suspension		14,849 05
Amount collected by receiver from assets to date (see schedule)	37,053 41	448,072 32
Amount collected by Comptroller—premium, interest, &c.	2,082 70	
Offsets allowed and settled (see schedule)	29,849 05	
Loss on promissory notes and other assets compounded or sold by order of court (see schedule)	10,156 09	
Bills receivable on hand, estimated good. $70,084 09		
Bills receivable on hand, estimated doubtful	96,755 64	
Bills receivable on hand, estimated worthless	14,669 78	
		181,509 51
Other assets: Good, $153,583 34; doubtful, $16,385 22; worthless, $175 00		187,421 56
(See schedules of above.)		

DISPOSITION OF COLLECTIONS.

Amount collected by receiver, as above, from assets (see schedule)	$37,053 41	
Amount collected by Comptroller, as above	2,082 70	
Amount collected from sale United States bonds April 30, 1879	21,275 00	
		$60,411 11
Loans paid and other disbursements (see schedule)	14,099 68	
Dividends paid by Comptroller's checks	23,840 69	
Legal expenses paid (see schedule)	383 18	
Receiver's salary, paid to date	2,250 00	
All other expenses (see schedule)	2,404 72	
Balance in hands of Comptroller: Comptroller, $553 88; United States Treasurer, $140 05	15,053 88	
Balance in hands of receiver	2,378 96	

CLAIMS.

Amount of claims proved to date	$265,556 26
Liabilities not proved, as shown by the books	10,020 02

DIVIDENDS.

Amount dividend checks received from Comptroller (—per cent.)....		$23,840 69
Amount dividend checks delivered.....	$23,165 61	
Amount dividend checks on hand.....	675 08	

B. U. KEYSER,
Receiver.

[Inclosure No. 40.]

Report of the condition of the German-American National Bank, in the hands of receiver for the quarter ending December 31, 1879.

ASSETS.

Assets at date of suspension, viz:			
Excess of bonds over circulation.....		$7,000 00	
Bills receivable (schedule with first report).....		235,443 71	
Other assets (schedule with first report).....		190,779 56	
Total assets at date of suspension.....			$433,223 27
Premium, interest, &c., collected since suspension.....			20,915 31
			454,138 58
Amount collected by receiver from assets to date (see schedule).....		43,108 65	
Amounts collected by Comptroller—premium, interest, &c.....		10,857 70	
Offsets allowed and settled (see schedule).....		30,002 44	
Loss on promissory notes and other assets compounded or sold by order of court (see schedule)..		10,156 09	
Bills receivable on hand, estimated good.	$68,366 87		
Bills receivable on hand, estimated doubtful.....	96,755 64		
Bills receivable on hand, estimated worthless.....	14,669 78		
		179,792 29	
Other assets: Good, $146,719.50; doubtful, $15,998.71; worthless, $17,503.20.....		180,221 41	
			454,138 58

(See schedules of above.)

DISPOSITION OF COLLECTIONS.

Amount collected by receiver, as above, from assets (see schedule).....	$43,108 65	
Amount collected by Comptroller, as above.....	10,857 70	
		$53,966 35
Amount collected from assessments upon stockholders (see schedule).....		
Loans paid and other disbursements (see schedule).....	18,030 49	
Dividends paid by Comptroller's checks.....	23,896 68	
Legal expenses paid (see schedule).....	761 84	
Receiver's salary, paid to date.....	2,700 00	
All other expenses (see schedule).....	2,692 13	
Balance in hands of Comptroller.....	3,527 45	
Balance in hands of receiver.....	2,357 76	
		53,966 35

CLAIMS.

Amount of claims proved to date.....	$267,260 09
Liabilities not proved, as shown by the books.....	8,316 19

DIVIDENDS.

Amount dividend checks received from Comptroller (10 per cent.)	$23,896 68
Amount dividend checks delivered	23,394 29
Amount dividend checks on hand	502 39

B. U. KEYSER,
Receiver.

[Inclosure No. 41.]

Report of the condition of the German-American National Bank, in the hands of receiver, for the quarter ending March 31, 1880.

ASSETS.

Assets at date of suspension, viz:		
Excess of bonds over circulation	$7,000 00	
Bills receivable (schedule with first report)	235,443 71	
Other assets (schedule with first report)	190,779 56	
Total assets at date of suspension		$433,223 27
Premium, interest, &c., collected since suspension (schedule)		24,859 03
		458,082 30
Amount collected by receiver from assets to date (see schedule)	50,449 65	
Amount collected by Comptroller—premium, interest, &c.	11,357 70	
Offsets allowed and settled (see schedule)	31,891 40	
Loss on promissory notes and other assets compounded or sold by order of court (see schedule)	10,156 09	
Bills receivable on hand, estimated good	$64,630 63	
Bills receivable on hand, estimated doubtful	96,665 64	
Bills receivable on hand, estimated worthless	14,669 78	
	175,956 05	
Other assets: Good, $144,918.50; doubtful, $15,848.71; worthless, $17,503.20	178,271 41	
		458,082 30

(See schedules of above.)

DISPOSITION OF COLLECTIONS.

Amount collected by receiver, as above, from assets (see schedule)	$50,449 65	
Amount collected by Comptroller, as above	11,357 70	
		$61,807 35
Amount collected from assessments upon stockholders (see schedule)		
Loans paid and other disbursements (see schedule)	20,666 69	
Dividends paid by Comptroller's checks	24,050 17	
Legal expenses paid (see schedule)	846 14	
Receiver's salary, paid to date	3,375 00	
All other expenses (see schedule)	2,936 98	
Balance in hands of Comptroller	8,527 45	
Balance in hands of receiver	1,404 92	
		61,807 35

CLAIMS.

Amount of claims proved to date	$267,652 70
Liabilities not proved, as shown by the books (schedule)	7,923 58

DIVIDENDS.

Amount dividend checks received from Comptroller (10 per cent.)	$24,050 17
Amount dividend checks delivered	23,834 97
Amount dividend checks on hand	215 20

B. U. KEYSER,
Receiver.

[Inclosure No. 42.]

Report of the condition of the German-American National Bank, Washington, D. C., in the hands of receiver, for the quarter ending June 30, 1880.

ASSETS.

Assets at date of suspension, viz:		
Excess of bonds over circulation	$7,000 00	
Bills receivable (schedule with first report)	235,443 71	
Other assets (schedule with first report)	190,779 56	
Total assets at date of suspension		$433,223 27
Premium, interest, &c., collected since suspension		28,760 40
		461,983 67
Amount collected by receiver from assets to date (see schedule)	57,304 56	
Amount collected by Comptroller—premium, interest, &c.	11,857 70	
Offsets allowed and settled (see schedule)	33,452 73	
Loss on promissory notes and other assets compounded or sold by order of court (see schedule)	10,212 24	
Bills receivable on hand, estimated good $50,148 73		
Bills receivable on hand, estimated doubtful 91,835 26		
Bills receivable on hand, estimated worthless 14,669 78		
	156,653 77	
Other assets: Good, $159,388.83; doubtful, $15,610.64; worthless, $17,503.20	192,502 67	
		461,983 67

(See schedules of above.)

DISPOSITION OF COLLECTIONS.

Amount collected by receiver, as above, from assets (see schedule)	$57,304 56	
Amount collected by Comptroller, as above	11,857 70	
Amount collected from assessments upon stockholders (see schedule)		
		$69,162 26
Loans paid and other disbursements (see schedule)	24,110 10	
Dividends paid by Comptroller's checks	24,050 17	
Legal expenses paid (see schedule)	901 64	
Receiver's salary, paid to date	4,500 00	
All other expenses (see schedule)	3,189 21	
Balance in hands of Comptroller	10,873 96	
Balance in hands of receiver	1,537 18	
		69,162 26

CLAIMS.

Amount of claims proved to date	$267,794 41
Liabilities not proved, as shown by the books	7,781 87

DIVIDENDS.

Amount dividend checks received from Comptroller (10 per cent.)	$24,050 17
Amount dividend checks delivered	23,879 92
Amount dividend checks on hand	170 25

B. U. KEYSER,
Receiver.

[Inclosure No. 43.]

Report of the condition of the German-American National Bank in the hands of receiver, for the quarter ending September 30, 1880.

ASSETS.

Assets at date of suspension, viz:		
Excess of bonds over circulation		$7,000 00
Bills receivable (schedule with first report)		235,443 71
Other assets (schedule with first report)		190,779 56
Total assets at date of suspension		$433,223 27
Premium, interest, &c., collected since suspension		33,391 64
		466,614 91
Amount collected by receiver from assets to date (see schedule)	63,719 63	
Amount collected by Comptroller, premium, interest, &c.	12,357 70	
Offsets allowed and settled (see schedule)	34,672 63	
Loss on promissory notes and other assets compounded or sold by order of court (see schedule)	10,212 24	
Bills receivable on hand, estimated good $47,522 41		
Bills receivable on hand, estimated doubtful 91,835 26		
Bills receivable on hand, estimated worthless 14,669 78		
	154,027 45	
Other assets: Good $158,533.83; doubtful, $15,583.23; worthless, $17,503.20	191,625 26	
		466,614 91

(See schedules of above.)

DISPOSITION OF COLLECTIONS.

Amount collected by receiver, as above, from assets (see schedule)	$63,719 63	
Amount collected by Comptroller, as above	12,357 70	
Amount collected from assessments upon stockholders (see schedule)	17,700 00	
		$93,777 33
Loans paid and other disbursements (see schedule)	26,463 02	
Dividends paid by Comptroller's checks	47,412 24	
Legal expenses paid (see schedule)	1,006 99	
Receiver's salary, paid to date	5,175 00	
All other expenses (see schedule)	3,363 71	
Balance in hands of Comptroller	8,511 89	
Balance in hands of receiver	1,844 48	
		93,777 33

ASSESSMENTS.

Amount of assessments on stockholders, 100 per cent	$130,000 00
Amount of assessments paid by stockholders	17,700 00

(See schedule.)

CLAIMS.

Amount of claims proved to date	$270,205 54
Liabilities not proved, as shown by the books	5,370 74

DIVIDENDS.

Amount dividend checks received from Comptroller (20 per cent.)	$47,412 24
Amount dividend checks delivered	45,319 01
Amount dividend checks on hand	2,093 23

B. U. KEYSER,
Receiver.

[Inclosure No. 44.]

Report of the condition of the German-American National Bank, in the hands of receiver, for the quarter ending December 31, 1880.

ASSETS.

Assets at date of suspension, viz:		
Excess of bonds over circulation	$7,000 00	
Bills receivable (schedule with first report)	235,443 71	
Other assets (schedule with first report)	190,779 56	
Total assets at date of suspension		$433,223 27
Premium, interest, &c., collected since suspension		36,303 85
		469,527 12
Amount collected by receiver from assets to date (see schedule)	69,714 63	
Amount collected by Comptroller, premium, interest, &c.	12,857 70	
Offsets allowed and settled (see schedule)	124,674 51	
Loss on promissory notes and other assets compounded or sold by order of court (see schedule)	10,212 14	
Bills receivable on hand, estimated good $43,937 74		
Bills receivable on hand, estimated doubtful 91,835 26		
Bills receivable on hand, estimated worthless 14,669 78		
	150,442 78	
Other assets: Good, $68,533.83; doubtful, $15,588.23; worthless, $17,503.20	101,625 26	
		469,527 12

(See schedules of above.)

DISPOSITION OF COLLECTIONS.

Amount collected by receiver, as above, from assets (see schedule)	$69,714 63	
Amount collected by Comptroller, as above	12,857 70	
Amount collected from assessments upon stockholders (see schedule)	18,344 00	
		$100,916 33
Loans paid and other disbursements (see schedule)	29,285 49	
Dividends paid by Comptroller's checks	47,548 36	
Legal expenses paid (see schedule)	1,046 24	
Receiver's salary, paid to date	5,625 00	
All other expenses (see schedule)	3,375 59	
Balance in hands of Comptroller	12,375 77	
Balance in hands of receiver	1,659 88	
		100,916 33

ASSESSMENTS.

Amount of assessments on stockholders, 100 per cent	$130,000 00
Amount of assessments paid by stockholders	18,344 00

(See schedule.)

CLAIMS.

Amount of claims proved to date	$270,740 19
Liabilities not proved, as shown by the books	4,836 09

DIVIDENDS.

Amount dividend checks received from Comptroller (20 per cent.)	$47,548 36
Amount dividend checks delivered	47,100 97
Amount dividend checks on hand	447 39

B. U. KEYSER,
Receiver.

[Inclosure No. 45.]

Report of the condition of the German-American National Bank, in the hands of receiver, for the quarter ending March 31, 1881.

ASSETS.

Assets at date of suspension, viz:		
Excess of bonds over circulation		$7,000 00
Bills receivable (schedule with first report)		235,443 71
Other assets (schedule with first report)		190,779 56
Total assets at date of suspension		$433,223 27
Premium, interest, &c., collected since suspension		41,010 17
		474,233 44
Amount collected by receiver from assets to date (see schedule)	73,513 56	
Amount collected by Comptroller, premium, interest, &c.	14,982 70	
Offsets allowed and settled (see schedule)	126,768 64	
Loss on promissory notes and other assets compounded or sold by order of court (see schedule)	10,212 24	
Bills receivable on hand, estimated good $42,908 94		
Bills receivable on hand, estimated doubtful 91,835 26		
Bills receivable on hand, estimated worthless 14,669 78		
	149,413 98	
Other assets: Good, $66,310.89; doubtful, $15,528.23; worthless, $17,503.20	99,342 32	
		474,233 44

(See schedules of above.)

DISPOSITION OF COLLECTIONS.

Amount collected by receiver, as above, from assets (see schedule)	$73,513 56	
Amount collected by Comptroller, as above	14,982 70	
Amount collected from assessments upon stockholders (see schedule)	25,550 00	
		$114,046 26
Loans paid, and other disbursements (see schedule)	30,636 59	
Dividends paid by Comptroller's checks	62,580 15	
Legal expenses paid (see schedule)	1,069 24	
Receiver's salary, paid to date	6,300 00	
All other expenses (see schedule)	3,751 54	
Balance in hands of Comptroller	6,468 98	
Balance in hands of receiver	3,239 76	
		114,046 26

ASSESSMENTS.

Amount of assessments on stockholders, 100 per cent	$130,000 00
Amount of assessments paid by stockholders	25,550 00

(See schedule.)

CLAIMS.

Amount of claims proved to date	$272,055 22
Amount of claims in dispute (see schedule)	
Liabilities not proved, as shown by the books	3,521 06

DIVIDENDS.

Amount dividend checks received from Comptroller (30 per cent.)	$62,580 15
Amount dividend checks delivered	61,612 99
Amount dividend checks on hand	967 16

B. U. KEYSER,
Receiver.

[Inclosure No. 46.]

Report of the condition of the German-American National Bank, in the hands of receiver, for the quarter ending June 30, 1881.

ASSETS.

Assets at date of supension, viz:		
Excess of bonds over circulation	$7,000 00	
Bills receivable (schedule with first report)	235,443 71	
Other assets (schedule with first report)	190,779 56	
Total assets at date of suspension		$433,223 27
Premium, interest, &c., collected since suspension		42,071 12
		475,294 39
Amount collected by receiver from assets to date (see schedule)	74,678 87	
Amount collected by Comptroller, premium, interest, &c.	14,982 70	
Offsets allowed and settled (see schedule)	137,614 05	
Loss on promissory notes and other assets compounded or sold by order of court (see schedule)	17,717 48	
Bills receivable on hand, estimated good	$34,579 03	
Bills receivable on hand, estimated doubtful	91,835 26	
Bills receivable on hand, estimated worthless	14,659 78	
	141,084 07	
Other assets: Good, $56,185.79; doubtful, $15,528.23; worthless, $17,503.20	89,217 22	
		475,294 39

(See schedules of above.)

DISPOSITION OF COLLECTIONS.

Amount collected by receiver, as above, from assets (see schedule)	$74,678 87	
Amount collected by Comptroller, as above	14,982 70	
Amount collected from assessments upon stockholders (see schedule)	33,355 50	
		$123,017 07
Loans paid and other disbursements (see schedule)	31,989 56	
Dividends paid by Comptroller's checks	64,738 02	
Legal expenses paid (see schedule)	1,146 89	
Receiver's salary, paid to date	7,200 00	
All other expenses (see schedule)	4,027 14	
Balance in hands of Comptroller	9,311 11	
Balance in hands of receiver	4,604 35	
		123,017 07

ASSESSMENTS.

Amount of assessments on stockholders	$130,000 00
Amount of assessments paid by stockholders	33,355 50

(See schedule.)

CLAIMS.

Amount of claims proved to date	$279,248 26

DIVIDENDS.

Amount dividend checks received from Comptroller (30 per cent.)	$64,738 02
Amount dividend checks delivered	63,787 54
Amount dividend checks on hand	950 48

B. U. KEYSER,
Receiver.

[Inclosure No. 47.]

Report of the condition of the German-American National Bank, in the hands of receiver, for the quarter ending September 30, 1881.

ASSETS.

Assets at date of suspension, viz:		
Excess of bonds over circulation	$7,000 00	
Bills receivable (schedule with first report)	235,443 71	
Other assets (schedule with first report)	190,779 56	
Total assets at date of suspension		$433,223 27
Premium, interest, &c., collected since suspension		43,187 44
		476,410 71
Amount collected by receiver from assets to date (see schedule)	75,729 15	
Amount collected by Comptroller, premium, interest, &c.	15,382 70	
Offsets allowed and settled (see schedule)	148,915 85	
Loss on promissory notes and other assets compounded or sold by order of court (see schedule)	17,717 48	
Bills receivable on hand, estimated good	$26,590 17	
Bills receivable on hand, estimated doubtful	91,835 26	
Bills receivable on hand, estimated worthless	14,669 78	
	133,095 21	
Other assets: Good, $52,538.89; doubtful, $15,528.23; worthless, $17,503.20	85,570 32	
		476,410 71

(See schedules of above.)

DISPOSITION OF COLLECTIONS.

Amount collected by receiver, as above, from assets (see schedule)	75,729 15	
Amount collected by Comptroller, as above	15,382 70	
Amount collected from assessments upon stockholders (see schedule)	34,922 16	
		126,034 01
Loans paid and other disbursements (see schedule)	35,977 32	
Dividends paid by Comptroller's checks	75,123 31	
Legal expenses paid (see schedule)	1,227 89	
Receiver's salary, paid to date	7,875 00	
All other expenses (see schedule)	4,318 04	
Balance in hands of Comptroller		
Balance in hands of receiver	1,512 45	
		126,034 01

ASSESSMENTS.

Amount of assessments on stockholders, 100 per cent	$130,000 00
Amount of assessments paid by stockholders	34,922 16
(See schedule)	

CLAIMS.

Amount of claims proved to date	*$279,248 26

DIVIDENDS.

Amount dividend checks received from Comptroller (40 per cent.)	75,123 31
Amount dividend checks delivered	73,001 86
Amount dividend checks on hand	2,121 45

B. U. KEYSER,
Receiver.

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* Total amount of claims presented and proved since the appointment of receiver, $279,248.26; since reduced by offsets to $104,207.38.

[Inclosure No. 48.]

A.—*Statement showing estimated deficiency between what sum the assets of the bank may be expected to realize and the amount of proved and unproved claims, making allowance for interest upon the claims of all creditors from the 14th day of June, A. D.* 1880, *and for the estimated expenses of the receivership.*

Total amount of indebtedness as it existed on the 15th day of June		$618,395 51
Add allowance for interest from that date on all claims, say for one year, which will, it is believed, represent an average of interest to be paid at 6 per cent		37,103 73
Total amount of claims		655,499 24
Assets will realize, as per annexed schedules	$386,781 34	
From which deduct expenses of receivership	20,000 00	
		366,781 34
Total deficiency		288,717 90

MEMORANDUM.—The above is a copy of statement received from the receiver, on which an order of assessment on the liability of stockholders of the First National Bank of Newark was based. The statement was accompanied by voluminous schedules showing in detail the assets and their estimated value, the liabilities to creditors, the names, residences, and amounts due to each of the latter being given, and the names of stockholders liable to assessment, and the amounts for which they were each liable.

[Inclosure No. 49.]

Report of the condition of the First National Bank, Newark, N. J., in the hands of receiver, for the quarter ending October 1, 1880.

ASSETS.

Assets at date of suspension, viz:			
Excess of bonds over circulation		$30,000 00	
Bills receivable (schedule with first report)		173,122 59	
Other assets (schedule with first report)		316,990 95	
Total assets at date of suspension		520,113 54	
Premium, interest, &c., collected since suspension		11,416 93	
			$531,530 47
Amount collected by receiver from assets to date (see schedule)		191,078 31	
Amount collected by Comptroller—premium, interest, &c		50,300 00	
Offsets allowed and settled (see schedule)		43,560 02	
Loss on promissory notes and other assets compounded or sold by order of court (see schedule)			
Bills receivable on hand—estimated good	$24,270 33		
Bills receivable on hand—estimated doubtful	26,276 07		
Bills receivable on hand—estimated worthless	1,600 50		
		52,146 90	
Other assets: Good, $1,121,159.65; doubtful, $37,764.63; worthless, $35,520.86; 10 cents		194,445 14	
(See schedules of above.)			531,530 37

DISPOSITION OF COLLECTIONS.

Amount collected by receiver, as above, from assets (see schedule)	$191,078 31	
Amount collected by Comptroller, as above	50,300 00	
Amount collected from assessments upon stockholders (see schedule)	232,816 73	
		$474,195 04

Loans paid and other disbursements (see schedule)		
Dividends paid by Comptroller's checks		
Legal expenses paid (see schedule)	$352 15	
Receiver's salary, paid to date		
All other expenses (see schedule)	2,005 93	
Balance in hands of Comptroller	470,200 00	
Balance in hands of receiver	1,636 96	
		$474,195 04

ASSESSMENTS.

Amount of assessments on stockholders	$300,000 00
Amount of assessments paid by stockholders (See schedule.)	232,816 73

CLAIMS.

Amonnt of claims proved to date	$552,176 87
Amount of claims in dispute (see schedule)	34,959 27
Liabilities not proved, as shown by the books	10,426 15

DIVIDENDS.

Amount dividend checks received from Comptroller (70 per cent), $386,523.80, payable on 1st October.

GARRET A. HOBART,
Receiver.

[Inclosure No. 50.]

Report of the condition of the First National Bank of Newark, N. J., in the hands of receiver, for the quarter ending January 1, 1881.

ASSETS.

Assets at date of suspension, viz:

Excess of bonds over circulation	$30,000 00	
Bills receivable (schedule with first report)	173,244 06	
Other assets, (schedule with first report)	317,172 57	
Total assets at date of suspension	520,416 63	
Premium, interest, &c., collected since suspension	12,259 78	
		$532,676 41
Amount collected by receiver from assets to date (see schedule)	212,446 32	
Amount collected by Comptroller—premium, interest, &c	50,300 00	
Offsets allowed and settled (see schedule)	43,560 02	
Bills receivable on hand, estimated good Bills receivable on hand, estimated doubtful Bills receivable on hand, estimated worthless	38,655 97	
Other assets: Good, $115,508.85; doubtful, $36,684.29; worthless, $35,520.86 (10 cents)	187,714 00	
		532,676 31

(See schedules of above.)

DISPOSITION OF COLLECTIONS.

Amount collected by receiver, as above, from assets (see schedule)	$212,446 32	
Amount collected by Comptroller, as above	50,300 00	
Amount collected from assessments upon stockholders (see schedule)	263,816 80	
		$526,563 12

Loans paid and other disbursements (see schedule)	$5,973 09	
Dividends paid by Comptroller's checks	458,143 00	
Legal expenses paid (see schedule)	1,438 75	
Receiver's salary, paid to date	1,000 00	
All other expenses (see schedule)	3,804 31	
Balance in hands of Comptroller	55,557 00	
Balance in hands of receiver	646 97	
		$526,563 12

ASSESSMENTS.

Amount of assessments on stockholders	$300,000 00	
Amount of assessments paid by stockholders (See schedule.)	263,816 80	

CLAIMS.

Amount of claims proved to date	$572,678 79	
Amount of claims in dispute (see schedule)	13,659 80	
Liabilities not proved, as shown by the books	10,426 15	

DIVIDENDS.

Amount dividend checks received from Comptroller (80 per cent.)	$458,143 00	
Amount dividend checks delivered	457,939 75	
Amount dividend checks on hand	203 25	

GARRETT A. HOBART,
Receiver.

[Inclosure No. 51.]

Report of the condition of the First National Bank of Newark, N. J., in the hands of receiver, for the quarter ending April 1, 1881.

ASSETS.

Assets at date of suspension, viz:		
Excess of bonds over circulation	$30,000 00	
Bills receivable (schedule with first report)	173,244 06	
Other assets (schedule with first report)	317,644 47	
Total assets at date of suspension	520,888 53	
Premium, interest, &c., collected since suspension	22,642 25	
		$543,530 78
Amount collected by receiver from assets to date (see schedule)	215,893 67	
Amount collected by Comptroller—premium, interest, &c	59,300 00	
Offsets allowed and settled (see schedule)	45,380 17	
Loss on promissory notes and other assets compounded or sold by order of court (see schedule)		
Bills receivable on hand, estimated good Bills receivable on hand, estimated doubtful Bills receivable on hand, estimated worthless	37,622 99	
Other assets: Good, $115,508.85; doubtful, $34,604.14; worthless, $35,220.86	185,333 85	
		543,530 68

(See schedules of above.)

DISPOSITION OF COLLECTIONS.

Amount collected by receiver, as above, from assets (see schedule)	$215,893 67	
Amount collected by Comptroller, as above	59,300 00	
Amount collected from assessments upon stockholders (see schedule)	263,927 78	
		539,121 45

Loans paid and other disbursements (see schedule)	$6,073 09	
Dividends paid by Comptroller's checks	488,193 57	
Legal expenses paid (see schedule)	1,569 23	
Receiver's salary, paid to date	3,000 00	
All other expenses (see schedule)	4,724 59	
Balance in hands of Comptroller	34,506 43	
Balance in hands of receiver	1,054 54	
		$539,121 45

ASSESSMENTS.

Amount of assessments on stockholders	$300,000 00	
Amount of assessments paid by stockholders	263,927 78	
(See schedule.)		

CLAIMS.

Amount of claims proved to date	$574,345 42	
Amount of claims in dispute (see schedule)	12,205 05	
Liabilities not proved, as shown by the books	10,336 15	

DIVIDENDS.

Amount dividend checks received from Comptroller (— per cent.)	$488,193 57	
Amount dividend checks delivered	487,835 63	
Amount dividend checks on hand	357 94	

GARRET A. HOBART,
Receiver.

[Inclosure No. 52.]

Report of the condition of the First National Bank, Newark, N. J., in the hands of receiver, for the quarter ending July 1, 1881.

ASSETS.

Assets at date of suspension, viz:		
Excess of bonds over circulation	$30,000 00	
Bills receivable (schedule with first report)	173,122 59	
Other assets (schedule with first report)	321,241 23	
Total assets at date of suspension	524,363 82	
Premium, interest, &c., collected since suspension	32,062 08	
		$556,425 90
Amount collected by receiver, from assets, to date (see schedule)	223,058 23	
Amount collected by Comptroller—premium, interest, &c.	67,250 00	
Offsets allowed and settled (see schedule)	45,380 17	
Loss on promissory notes and other assets compounded or sold by order of court (see schedule)		
Bills receivable on hand, estimated good	36,262 14	
Bills receivable on hand, estimated doubtful		
Bills receivable on hand, estimated worthless		
Other assets: Good, $114,938.85; doubtful, $34,315.55; worthless, $35,220.86 (10 cents)	84,475 26	
		556,425 80

(See schedules of above)

DISPOSITION OF COLLECTIONS.

Amount collected by receiver, as above, from assets (see schedule	$223,058 23	
Amount collected by Comptroller, as above	67,250 00	
Amount collected from assessments upon stockholders (see schedule)	263,994 44	
		$554,302 67

Loans paid and other disbursements (see schedule)	$6,073 09	
Dividends paid by Comptroller's checks	522,532 99	
Legal expenses paid (see schedule)	6,711 58	
Receiver's salary, paid to date	3,000 00	
All other expenses (see schedule)	5,359 60	
Balance in hands of Comptroller	8,117 01	
Balance in hands of receiver	2,508 40	
		554,302 67

ASSESSMENTS.

Amount of assessments on stockholders	$300,000 00
Amount of assessments paid by stockholders	263,994 44

(See schedule.)

CLAIMS.

Amount of claims proved to date	$580,592 26
Amount of claims in dispute (see schedule)	5,254 21
Liabilities not proved, as shown by the books	10,069 81

DIVIDENDS.

Amount dividend checks received from Comptroller (90 per cent.)	$522,532 99
Amount dividend checks delivered	522,204 66
Amount dividend checks on hand	328 33

GARRET A. HOBART,
Receiver.

[Inclosure No. 53.]

Report of the condition of the First National Bank, Newark, N. J., in the hands of receiver, for the quarter ending September 30, 1881.

ASSETS.

Assets at date of suspension, viz:		
Excess of bonds over circulation	$30,000 00	
Bills receivable (schedule with first report)	173,122 59	
Other assets (schedule with first report)	321,241 23	
Total assets at date of suspension	524,363 82	
Premium, interest, &c., collected since suspension	33,294 67	
		$557,658 49
Amount collected by receiver, from assets, to date (see schedule)	223,935 92	
Amount collected by Comptroller—premium, interest, &c.	67,968 75	
Offsets allowed and settled (see schedule)	46,161 22	
Loss on promissory notes and other assets compounded or sold by order of court (see schedule)		
Bills receivable on hand, estimated good	35,174 92	
Bills receivable on hand, estimated doubtful		
Bills receivable on hand, estimated worthless		
Other assests: Good, $114,881.17; doubtful, $34,315.55; worthless, $35,220.86 (10 cents)	184,417 58	
		557,658 39

(See schedules of above.)

DISPOSITION OF COLLECTIONS.

Amount collected by receiver, as above, from assets (see schedule)	$223,935 92	
Amount collected by Comptroller, as above	67,968 75	
Amount collected from assessments upon stockholders (see schedule)	264,050 12	
		$555,954 79

Loans paid and other disbursements (see schedule)	$7,617 09	
Dividends paid by Comptroller's checks	522,532 99	
Legal expenses paid (see schedule)	7,791 93	
Receiver's salary, paid to date	3,000 00	
All other expenses (see schedule)	5,813 17	
Balance in hands of Comptroller	8,835 76	
Balance in hands of receiver	363 85	
		$555,954 79

ASSESSMENTS.

Amount of assessments on stockholders	$300,000 00
Amount of assessments paid by stockholders (See schedule.)	264,050 12

CLAIMS.

Amount of claims proved to date	$580,592 26
Amount of claims in dispute (see schedule)	5,254 21
Liabilities not proved, as shown by the books	10,069 81

DIVIDENDS.

Amount dividend checks received from Comptroller (90per cent.)	$522,532 99
Amount dividend checks delivered	522,279 33
Amount dividend checks on hand	253 66

GARRET A. HOBART,
Receiver.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING

A communication from the Chief of Engineers, dated the 19th instant, covering copy of a report from Capt. Thomas H. Handbury, Corps of Engineers, upon an examination of Little Red River, Arkansas.

DECEMBER 21, 1881.—Referred to the Committee on Commerce and ordered to be printed.

WAR DEPARTMENT,
Washington City, December 20, 1881.

The Secretary of War has the honor to transmit to the United States Senate, for the information of the Committee on Commerce, a communication from the Chief of Engineers, dated the 19th instant, covering copy of a report from Capt. Thomas H. Handbury, Corps of Engineers, upon an examination of Little Red River, Arkansas, made in compliance with the requirements of the river and harbor act of March 3, 1881.

ROBERT T. LINCOLN,
Secretary of War.

The PRESIDENT *pro tempore*
of the United States Senate.

OFFICE OF THE CHIEF OF ENGINEERS,
UNITED STATES ARMY,
Washington, D. C., December 19, 1881.

SIR: To comply with provisions of the river and harbor act of March 3, 1881, I have the honor to submit herewith a copy of a report to this office from Capt. Thomas H. Handbury, Corps of Engineers, of the results of an examination made under his direction of Little Red River in Arkansas.

Very respectfully, your obedient servant,

H. G. WRIGHT,
Chief of Engineers, Brig. and Bvt. Maj. Gen.

Hon. ROBERT T. LINCOLN,
Secretary of War.

EXAMINATION OF LITTLE RED RIVER IN ARKANSAS.

UNITED STATES ENGINEER OFFICE,
Little Rock, Ark., December 8, 1881.

GENERAL: The examination of the Little Red River, Arkansas, with a view to improving its condition for navigable purposes, provided for in section 3 of the river and harbor act approved March 3, 1881, was assigned to my charge by letter of the Engineer Department dated March 21, 1881.

This examination has been made, and the results I now have the honor to report.

The Little Red River is a small stream that rises in the western portion of Van Buren County, Arkansas. Its course is in an easterly direction through said county, and southeast through White County to its junction with the White River, about 20 miles below Augusta, Ark. The stream is of no importance whatever in a navigable point of view until we reach the vicinity of the town of Searcy, situated 2 miles west of its right bank, and about 48 miles from its mouth. Steamboats have on one or two occasions during very high stages of water ascended for this distance.

As a general thing the stream cannot be said to be navigable above the town of Judsonia, 39 miles from its junction with the White River. In considering the present improvement of this stream, all above this point may very properly be omitted, for the reason that no improvement in its navigable qualities could be made without resort to some species of slackwater structures, the expense of which would exceed the total value of all the commerce that would be transported over it for many years. Even this would not insure continual navigation, as the bed of the stream is not unfrequently capable of being crossed dry shod.

From Judsonia down it is possible, within justifiable limits of expense, to put the stream in a condition to be navigated for from seven to eight months during the year; and to West Point, 30 miles from its mouth, it can, perhaps, be made navigable throughout the entire year. The backwater from the White River at its ordinary stage extends to this point, and during its high-water to Judsonia.

The principal obstructions to the navigation of this part of the stream are snags and overhanging trees at intervals throughout the entire distance, a sand-bar below West Point, and a shoal (Atley's) between West Point and Judsonia.

It is estimated that $16,100 will be required to remove these obstructions and place the river in a condition which will suffice for the present needs of its commerce.

For more detailed results of this examination, and for such statistical information as we have been able to collect, I respectfully refer to the report of Assistant F. W. Tuttle, herewith inclosed.

Very respectfully, your obedient servant,

THOS. H. HANDBURY,
Captain, Corps of Engineers.

Brig. Gen. H. G. WRIGHT,
Chief of Engineers, U. S. A.

REPORT OF MR. F. W. TUTTLE, ASSISTANT ENGINEER.

UNITED STATES ENGINEER OFFICE,
Little Rock, Ark., December 6, 1881.

CAPTAIN: I have the honor to submit the following report on my examination of the Little Red River, Arkansas:

The examination was made October 18–22, 1881, in compliance with instructions contained in your letter dated October 4, 1881, and covered that portion of the river included between Searcy Landing and its junction with the White, a distance of 48 miles. Its objects were the collection of data in regard to obstructions to its navigation and of statistical information bearing upon contemplated improvements.

By a reference to the accompanying sketch, a general idea of the topography of this section of the country can be obtained. The only towns on the stream are Searcy, Judsonia, and West Point.

Searcy, 2 miles from the river and 48 miles from its mouth, is a growing town of 1,400 inhabitants. It shipped last season 9,800 bales of cotton, together with green and dry hides and wool on which figures were not obtained; 6,600 bales of cotton went to Saint Louis via the Saint Louis, Iron Mountain and Southern Railroad. The remaining 3,200 bales went out of the river, finding a market at Memphis or New Orleans. The value of its receipts is somewhat in excess of the value of its shipments. Judsonia, at the crossing of the Saint Louis, Iron Mountain and Southern Railroad, and 39 miles from the mouth of the river, has a population of 425.

It shipped last season 1,512 bales of cotton, of which nearly all went to Saint Louis also, 4,000 pounds each of green and dry hides and 5,000 pounds of wool; also, some fruit. There is a mill at this place capable of turning out 10,000 feet of lumber per day.

The railway bridge has a draw span. The length of this span is 262 feet 9 inches, and the distance between piers is 116 feet. The elevation of the lower chord above high-water is 6 feet 6 inches, and above low-water 42 feet.

West Point, 30 miles from the mouth, is practically the present head of navigation. There has been but one boat above it in several years. It is a town of about 125 inhabitants and handles about 400 bales of cotton annually. It is little more than a shipping point for Searcy, with which it is connected by a horse-car railway crossing the Iron Mountain Railroad at Kensett.

CONDITION OF THE STREAM.

The river between Searcy Landing and West Point has an average width of 300 feet. Its banks at no point have an elevation of less than 25 feet and do not cave. Its bottom is generally rocky.

There are on this reach three shoals, which at low-water cannot be passed with a skiff. Whittle's Shoal, 4½ miles below Searcy Landing, is 200 feet long, and consists of a solid ledge of rock covered with loose bowlders and *débris*.

Judsonia Ford, at and above the town of Judsonia, is a very formidable obstruction. It consists of a series of ledges crossing the river at right angles and covered to a greater or less extent with loose rocks and bowlders. Its entire length is not much less than a mile.

Atley's Shoal, 4 miles below Judsonia, consists principally of loose rock. There are two main deposits separated by about 2,000 feet of clear river, having a depth of 4 feet. Deep water, with occasional large bowlders, is encountered almost immediately above and below.

The river at these shoals can, during low-water, be crossed dry shod. They act as dams, and the water in the pools between them has no perceptible current. The examination having been made without the use of instruments, the differences in elevation of these pools could not be definitely determined. From the best data at hand the total fall from Searcy Landing to West Point is estimated at 12 feet. These shoals during the three months of high-water offer no obstruction to the passage of boats.

There are on this reach thirty-seven snags, and one hundred and fifty leaning trees over one foot in diameter, besides many smaller ones, which would, were there no shoals, be considered as obstructions to navigation.

Below West Point the river has an average width of 225 feet, with a bank elevation of about 25 feet. Its bottom is generally sandy, with some gravel and occasionally bowlders. It has little or no fall; water from the White River backs up to West Point the year round. Knight's Bar, 20 miles from the mouth, is the only shoal in this portion of the stream. It is composed of sand, gravel, and scattered bowlders. The minimum depth of water that obtains upon it is 22 inches. Its length is about 300 feet. At ordinary low-water it is readily passed by the steamer Hard Cash, of the Memphis and White River Packet Company, on her regular weekly trips to West Point. During unusually dry seasons there are, however, about two months when she is unable to cross it. There are on this reach 371 snags, and 555 leaning trees over 1 foot in diameter, besides many smaller ones, which are obstructions to its navigation.

IMPROVEMENTS.

It is not thought best, in making an estimate of the cost of improving this stream, to provide for work above Judsonia. Very little good could result from the removal of loose rock from Whittle's Shoal and Judsonia Ford, and to cut a channel through them would not only be an expensive work, but would drain the pools above. The construction of locks, the only means by which low-water navigation is possible, is not warranted by the benefits which would thereby be derived. The discharge of the stream, except during freshets, is insignificant, and backwater from the White, which alone at other times makes the Little Red a navigable stream, does not, at ordinary stages, extend farther than Atley's Shoal. During high-water in eitherstream these shoals can be passed in their present condition.

It remains, then, to remove the snags and leaning timber below Judsonia, to remove the bowlders from and to deepen the channel over Knight's Bar, and to open a passage for boats through the loose rock at Atley's Shoal. This done, it is thought the boats can reach Judsonia eight months in the year and West Point at all times. Two flat-boats, one carrying a crane and capstan, with the ordinary appliances for removing snags and bowlders from the beds of small streams, and the other quarters for a working party, will constitute a plant well suited to this work. I submit the following:

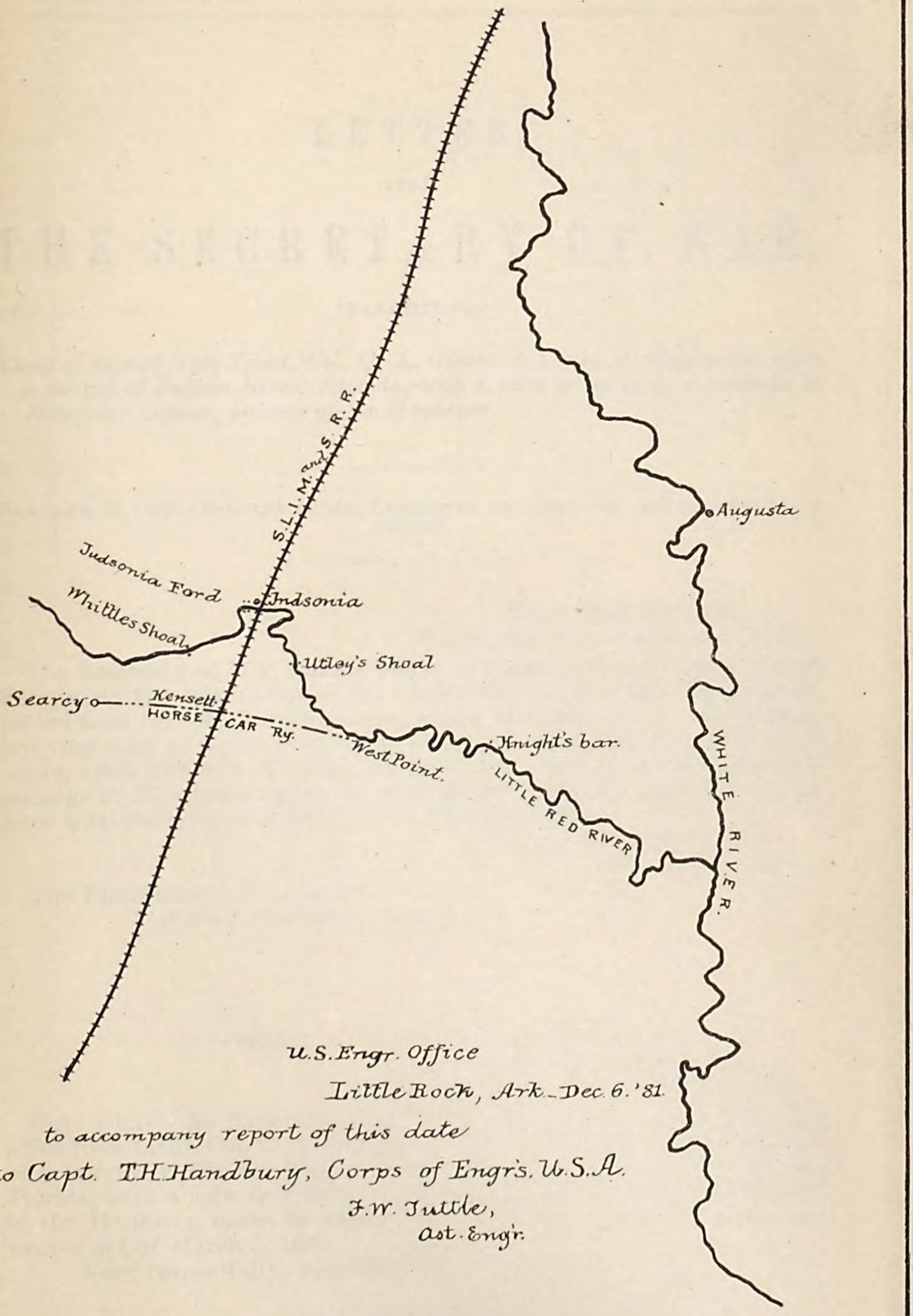
ESTIMATE OF COST:

Plant	$3,000 00
Removal of snags and leaning timber below Judsonia, three months' work, at $1,200	3,600 00
Improvements at Atley's Shoal	7,500 00
Improvements at Knight's Bar	2,000 00
	16,100 00

Respectfully submitted.

F. W. TUTTLE,
Assistant Engineer.

Capt. T. H. HANDBURY,
Corps of Engineers, U. S. A.



U.S. Engr. Office

Little Rock, Ark. Dec. 6. '81.

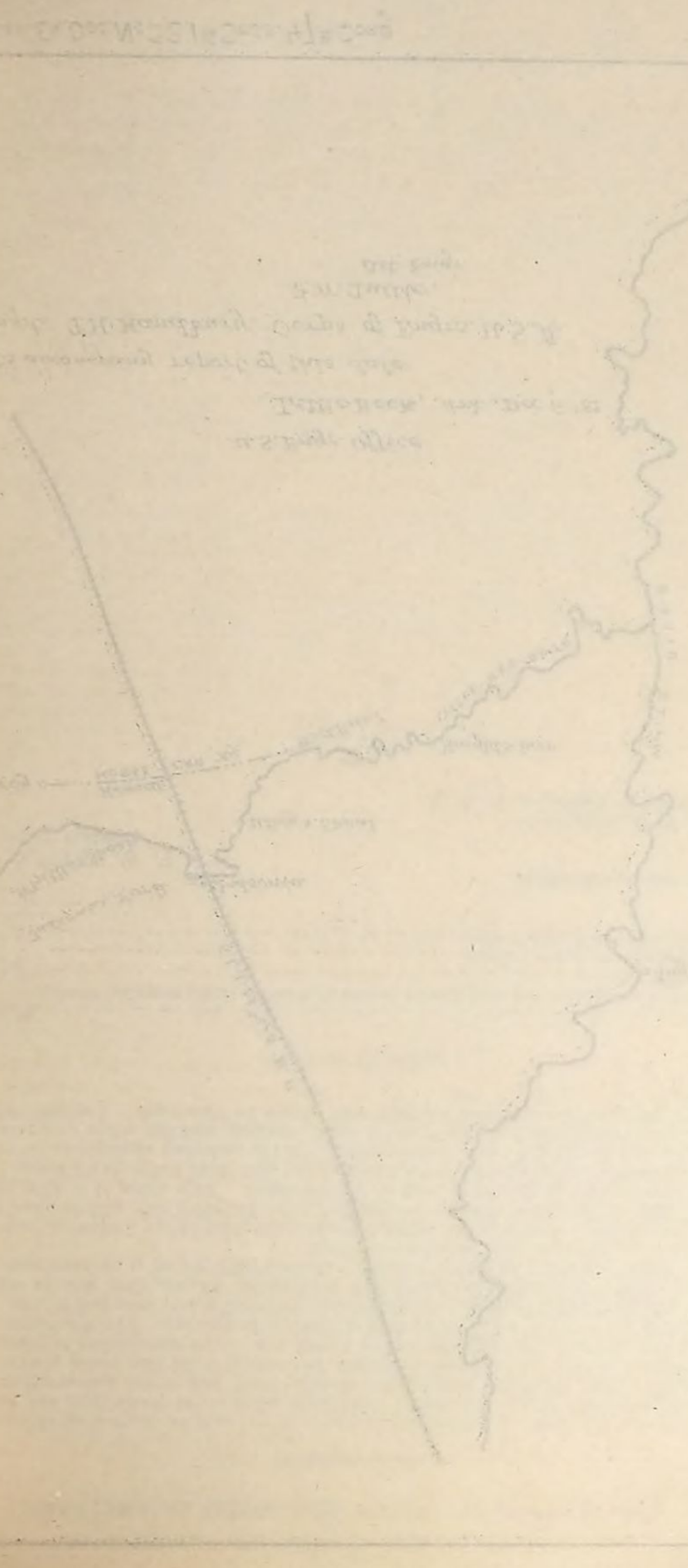
to accompany report of this date

to Capt. T.H. Handbury, Corps of Engr's. U.S.A.

F.W. Tuttle,

Ast. Eng'r.

Sen. Ex. Doc. No. 32. 1st Sess. 47th Cong.



47TH CONGRESS, 1st Session. } SENATE. { EX. DOC. No. 33.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING

Copy of report from Lieut. Col. Q. A. Gillmore, Corps of Engineers, upon a survey of Indian River, Florida, with a view to opening a passage to Mosquito Lagoon, by way of the Haulover.

JANUARY 5, 1882.—Referred to the Committee on Commerce and ordered to be printed.

WAR DEPARTMENT,
Washington City, January 4, 1882.

The Secretary of War has the honor to transmit to the United States Senate, for the information of the Committee on Commerce, a communication from the Chief of Engineers, dated the 24th ultimo, and accompanying copy of report from Lieut. Col. Q. A. Gillmore, Corps of Engineers, upon a survey of Indian River, Florida, with a view to opening a passage to Mosquito Lagoon, by way of the Haulover, made in compliance with the river and harbor act of March 3, 1881.

ROBERT T. LINCOLN,
Secretary of War.

The PRESIDENT *pro tempore*
of the United States Senate.

OFFICE OF THE CHIEF OF ENGINEERS,
UNITED STATES ARMY,
Washington, D. C., December 24, 1881.

SIR: I have the honor to submit herewith a copy of a report to this office from Lieut. Col. Q. A. Gillmore, Corps of Engineers, of the results of a survey under his direction of the north end of Indian River, Florida, with a view to opening a passage to Mosquito Lagoon by way of the Haulover, made to comply with requirements of the river and harbor act of March 3, 1881.

Very respectfully, your obedient servant,

H. G. WRIGHT,
Chief of Engineers, Brig. and Bvt. Maj. Gen.

Hon. ROBERT T. LINCOLN,
Secretary of War.

SURVEY OF THE NORTH END OF INDIAN RIVER WITH A VIEW TO ITS CONNECTION, BY THE HAULOVER, WITH MOSQUITO LAGOON.

UNITED STATES ENGINEER OFFICE,
New York, December 3, 1881.

GENERAL: I have the honor to submit herewith a report of a survey made at the north end of Indian River, Florida, with an estimate of the cost of opening a suitable channel between it and Mosquito Lagoon, about one-half a mile to the eastward, as provided for by section 3 of the river and harbor act approved March 3, 1881, assigned to my charge by department letter dated March 21, 1881.

The survey was made during the month of August, 1881, by Mr. J. F. Le Baron, assistant engineer.

The place referred to is located in Volusia County, and is known as the Haulover. A canal was dug here in the years of 1853 and 1854, to connect Indian River and Mosquito Lagoon, both estuaries of the Atlantic Ocean, running more or less parallel to the east coast of Florida, with a comparatively narrow strip of land between them and the ocean.

From the Haulover, Indian River runs in a south-southeast direction for about 100 miles, and then connects with the sea by Indian River Inlet, but actually continues further south about 40 miles under the names of Saint Lucie Sound and Jupiter Narrows, respectively, and terminates in a pass to the ocean named Jupiter Inlet.

The general direction of Mosquito Lagoon is about north-northwest. Its southern end is about 18 miles southeast of the head of Indian River and about 14 miles northeast of Cape Canaveral. It connects with the ocean at Port Orange by Mosquito Inlet, about 32 miles north of the Haulover, but extends further north under the name of Halifax River.

Indian River and Mosquito Lagoon are separated by a low and nearly level isthmus, which is about 3 miles wide at its northerly end, at the head of Indian River, but gradually narrows as it extends in a southeasterly direction, finally merging in the marshes north of Merritt's Island. At the site of the Haulover, 8 miles from the head of Indian River, the isthmus is less than one-half mile in width.

The scheme of opening a passage from Mosquito Lagoon to Indian River was referred to over fifty years ago, in an act of Congress approved March 2, 1827, which provided that if any part of certain appropriations should remain unexpended it should be applied to that work, as being in the line of communication to Cape Florida.

Nothing further was done on the part of government until, by act approved June 15, 1844, the sum of $1,500 was appropriated for improving the Haulover.

A survey of the locality was made in 1845 by Lieut. J. E. Blake, United States Topographical Engineers, supposed to have been done by direction of General Worth, with a view of opening a passage for boats carrying supplies to the United States troops stationed at various points on the coast.

A subsequent appropriation of $5,000, made by act approved August 30, 1852, was applied during the years of 1853 and '54 to the construction of a canal, on the plan and under the direction of Lieut. (now Brig. General and Chief of Engineers) H. G. Wright.

The cut was limited to a bottom width of 8 feet and a depth of water of 2 feet, with vertical banks where coquina rock occurred, and with side slopes of 45 degrees in sand. These dimensions were deemed about sufficient for the class of boats then in use on either lagoon; in fact, it

was thought that not more than 2 feet could be carried up Mosquito Lagoon to the Haulover. The estimate provided for continuing the channel 300 feet into each lagoon beyond the shore line.

The necessity of making further appropriations to secure a proper and permanent channel was pointed out at that time by Lieutenant Wright in his official communications, but nothing further was done by the United States Government until near the close of the last session of Congress, when the survey just completed was directed to be made.

The isthmus is nowhere more than about 8 or 9 feet above the water surface. The top soil is generally sand, with underlying coquina rock —a conglomerate of small broken shells held together by some natural cement. It crops out at many points, and the indications are that over considerable areas this rocky substratum is continuous. The upper layer is the finest and hardest; lower down its cementing power deteriorates.

The surface of the bed of Indian River and Mosquito Lagoon is composed of sand and finely-broken shells. In Haulover Bay, a small estuary of Indian River, immediately in front of the western entrance of the canal, mud is found.

Coquina rock, with shell, also underlies the bed of Indian River, Haulover Bay, and the salt marsh separating them. In Mosquito Lagoon it was found at one place only, in the vicinity of the eastern entrance of the canal; otherwise the substratum consists here of mud and clay.

These facts were elicited by numerous borings made during the recent survey, and accord with the results of investigations made in former years by Lieut. J. E. Blake and Lieut. H. G. Wright.

The fluctuations of the water-level on either side of the Haulover, due to the tidal wave of the ocean, are very small. In Mosquito Lagoon the mean rise and fall of tide is stated to be $1\frac{1}{2}$ inches, and in Indian River, 3 inches.

A much greater difference in the height of the water surface is caused by heavy rains and winds. Assistant Le Baron, who has resided for several years in the neighborhood of the Haulover, says a heavy and long-continued rainfall causes the level of Indian River to rise sometimes as much as 4 feet above its mean height. It falls to its ordinary level very gradually, owing to its extended surface and the long distance between the seaward entrance and the head. Mosquito Inlet being much nearer, the water surface of Mosquito Lagoon is lowered more rapidly, thus producing a difference of level at the Haulover and a current through the canal.

Strong winds produce similar effects. They cause a difference of level between the water surfaces at the two ends of the Haulover, amounting sometimes to as much as 2 feet.

At one time during the recent survey a heavy northeast storm raised the water of Mosquito Lagoon 20 inches above the level of Indian River, creating a current through the Haulover canal of 2.8 miles per hour. The prevailing winds are from the north.

The field operations consisted chiefly in running a transit and level line from Mosquito Lagoon to Indian River, with cross-sections every 100 feet. Tide gauges were set up in Haulover Bay and Mosquito Lagoon. Soundings were carried out on either side, to about 6 feet water. Nearly forty borings were made, partly in the existing canal, and partly along its axis produced into Haulover Bay, Indian River, and Mosquito Lagoon. The soundings and borings, as given on the accompanying chart, are referred to the mean low-water datum of the Coast and Geodetic Survey, as shown on a stone bench-mark in Haulover Bay.

An examination of the isthmus, north and south of the present Haulover Canal, seemed to indicate that about 1 mile north of it a rather more eligible site might be had if a new canal were to be made, as no bay and salt marsh would there be interposed between the western end of the land cut and Indian River, reducing the distances between the 5-foot curves on either side about half a mile. The advantages offered by the existing cut in facilitating the operations of a dredge-boat are, however, too manifest to render the abandonment of the old line expedient or desirable.

The canal had originally a width of 12 feet at the water-surface in the earth cut. It varies now from 12 to 33 feet, and the depths from 1.7 to 3.8 feet. The banks are undermined by the action of the current on the loose shell below the rock. The material detached from the caving sides is carried out and deposited in the form of shoals near the entrances.

The canal is generally in a neglected condition, although some years ago it was cleared out by private enterprise for the passage of boats of 11 feet beam, and from 16 to 18 inches draught.

The length of the land cut is now 2,087 feet; originally it was 2,150 feet. Assistant Le Baron found no traces of the channels on either side, included in Lieutenant Wright's estimate of 1853. A low line of riprap, extending into the lagoon on the north side of the channel, is nearly covered up by sand. It seems to have failed its purpose, if it was designed to maintain the depth of the eastern entrance channel.

Comparing the Coast and Geodetic Survey chart of 1875–'76 with the results obtained by the recent survey, it appears that in the vicinity of the Haulover the 4 and 5-foot curves are now on each side about one-fourth mile nearer to the shore. A gradual receding or wearing away of the shore lines seems to have taken place since Lieutenant Blake made his survey in 1845.

UNITED STATES RESERVATION.

By a proclamation of the President of the United States, dated August 26, 1880, a reservation was declared, embracing a tract of land 1,000 feet wide north and south of the center line of the canal. In the same year the United States Land Office had a survey made of the land thus reserved except a portion belonging to Andrew Jackson lying within the southern part of the reservation.

The tract then surveyed includes land entered by certain settlers under the homestead law prior to the President's proclamation. Most probably the parties that have settled lawfully within the reservation will enter claims for damages if compelled to cede their land to the United States.

PLAN OF IMPROVEMENT.

The plan proposed by Assistant Engineer Le Baron essentially consists in enlarging the cross-section of the present canal and in continuing the cut to deep water on each side between parallel training walls or jetties.

The bottom width of the improved canal is designed to be 60 feet, depth of water $4\frac{1}{2}$ feet, side slopes in loose material 1 on 2, and in rock cut 1 on $\frac{1}{4}$. To prevent caving in and washing off of the banks, the slopes of the land cut would be revetted with coquina riprap to a height of 4 feet above mean low-water. This protection is intended to remove one of the principal causes of shoaling at both entrances.

Cuts of cross-sections similar to those of the land cut would be made

by dredging in continuation of the line of the latter. The length of the cut in Mosquito Lagoon would be 1,880 feet in Haulover Bay, and Indian River 5,020 feet, 1,170 feet of the latter being through coquina rock, averaging 4 inches thick.

The jetties on either side are to be about 100 feet apart. In Mosquito Lagoon their length would be 2,120 feet, if carried out to 5.8 depth of water, their width at the root being 6 feet, and at the head 14 feet.

In Indian River their length is estimated at 4,050 feet, ending in 4.8 feet of water, the width on shore being 6 feet, and at the head 12 feet.

The project also provides for a cross-dam, 610 feet long and 8 feet wide, across Haulover Bay, near the southern border of the channel across that estuary.

The jetties and the cross-dam are considered to be necessary for preserving the depths of the channel secured by dredging.

These structures are designed to consist of mattresses, made in the form of palmetto-log rafts covered with compact layers of brush, the aggregate thickness of the work being 30 inches. These mattresses will be overlaid and held in place by coquina rock obtained from the excavations.

The top of the jetties will be about 1 foot below mean low-water; the cross-dam will reach about 6 inches above that level.

Abundant material for making the mats is found within available distances, and in that locality it is believed that coquina rock will answer as a substitute for harder and more compact varieties of stone.

Such rock gained from the excavations as may not be needed for revetting the slopes or covering the mats will be added to the jetties by dumping it in their rear. As far as practicable the harder kind will be used on the slopes and mats.

It is estimated that in executing the project 70,026 cubic yards of sand and loose shell and 14,972 cubic yards of coquina will have to be removed, and that from 1,665 cubic yards of coquina, or about one-ninth of the whole, will have to be dredged from Indian River. The cost of removing sand and shell is estimated at 20 cents per cubic yard, of rock on land at $1.50 per cubic yard, and of rock by dredging at $2 per cubic yard. The mattress work is estimated to cost $1 per square yard.

The total estimated cost of the improvement, as here described in general terms, and including 10 per cent. for contingencies, is about $56,000.

The cost of the land damages that will occur when the government takes formal possession of the reservation is estimated by Mr. Le Baron at $10,000, making a total of $66,000.

The dimensions of the canal as given in the project for its improvement were adopted with a view of accommodating steamboats of 25 or 30 feet beam, and 3 or 4 feet draught.

It is believed from information received that boats of this class will be put on, as soon as the passage is opened, to ply between points on Indian River, Mosquito Lagoon, and Halifax River, to form a connection at Mosquito Inlet with an outside line of steamers to Jacksonville and Savannah.

The need of an improved canal is keenly felt by the people living on the estuaries named in this report, from Daytona, on Halifax River, to Lake Worth, south of Jupiter Inlet, a distance of over 200 miles. At various times of late they have attempted to combine for the purpose of effecting the improvement, but failed for want of means. The settlers have greatly increased in numbers during the last ten years. They are chiefly engaged in raising tropical and semi-tropical fruits and vegetables. Generally they are compelled to employ all their available

capital in rendering their lands productive, and have little to spare in establishing routes of communication. Such lines, however, are of the highest importance to them, and to the further development of the resources of this section of the country. Much interesting information on this point is furnished in Assistant Le Baron's report, to which attention is respectfully invited.

This work is located in the collection district of Saint Augustine, Florida. Saint Augustine is the only port of entry of the district. A statement of the collector of customs is appended to Mr. Le Baron's report.

The following papers are herewith transmitted:

The report of Mr. J. F. Le Baron, assistant engineer, accompanied by
A tracing of plan of the proposed widening of Haulover Canal, and by
A tracing of comparative chart of the vicinity of the Haulover Canal.

Very respectfully, your obedient servant,

Q. A. GILLMORE,
Lieut. Colonel of Engineers, Bvt. Maj. Gen., U. S. A.

Brig. Gen. H. G. WRIGHT,
Chief of Engineers, U. S. A.

REPORT OF MR. J. F. LE BARON, ASSISTANT ENGINEER.

UNITED STATES ENGINEER OFFICE,
Jacksonville, Fla., November 11, 1881.

GENERAL: I have the honor to report that in compliance with your instructions of August 1, 1881, I have made an examination and survey for a further improvement of the Haulover Canal, and approaches in Indian River and Mosquito Lagoon, Florida, as provided for in the act of Congress approved March 3, 1881, and submit herewith my report, together with plans and estimates.

The Haulover Canal is situated on the east coast of Florida, and connects the waters of the Indian River (so called) and Mosquito Lagoon, both of which are essentially large shallow salt-water lagoons, with, at this place, no perceptible tide, except such as is caused by the winds.

The United States Coast Survey state that there is a tide in Mosquito Lagoon at this locality of $1\frac{1}{2}$ inches, and in Indian River of 3 inches.

During long continued and heavy rains the level of Indian River is sometimes raised over 4 feet above its mean height, and keeps nearly at that height, very gradually falling, for several months.

Owing to the greater distance from the sea, the greater area of water surface, and a smaller outlet to the ocean than Mosquito Lagoon, the water in the Indian River falls much slower than in Mosquito Lagoon, and it thus happens that Indian River at such times is several feet higher than the water of the lagoon, and there is consequently a very strong current running through the canal from the river to the lagoon. This occurred in 1878, coming under my own observation, when a height of 2 to 3 feet above the lagoon was maintained for several months, and passage through the canal was almost impossible against the current.

For a relief at such a time, should it ever occur again, it would probably be better to open a cut from the head of Banana River to the ocean, through the beach at "Pepper Haulover," where the distance is only a few rods, and allow the water to escape. This would avoid the necessity for locks in the canal, and would be a grateful relief to the submerged plantations, and the cost would be trifling compared to locks.

The present canal is a narrow cut, varying from 33 to 12 feet in width at the water surface, which pierces the narrow isthmus separating these bodies of water about 8 miles from their respective heads, with a depth of water at present varying from 3.8 to 1.7 feet at mean low-water.

HISTORY.

The present Haulover Canal was built in the spring of 1853 by the United States Government according to the plans and under the immediate direction of Lieut. H. G. Wright (now brigadier-general and brevet major-general and Chief of Engineers, U. S. A.), and was designed for the passage of small boats only.

The first survey of this canal was made by Lieut. J. E. Blake, of the United States

Topographical Engineers, in 1845, under the direction of General Worth, with the view of opening a passage for boats carrying supplies for the United States Army, then operating against the Indians at various places on this coast, and the canal was subsequently constructed on the line located by him.

The original dimensions of the canal as planned by Lieutenant (now General) Wright, gave a width at the ordinary water level of 12 feet in the earth cuts, a bottom width of 8 feet, a depth of 2 feet, with side slopes of 1, to 1 in earth cuts, and with perpendicular sides in the rock cutting. Its length, as given by Lieutenant (now General) Wright in his report to Gen. J. G. Totten, then Chief Engineer of the United States Engineers, was, in 1853, about 2,150 feet. As determined by Lieutenant Blake in his survey in 1845, it appears to have been 2,187 feet according to his profile. It is now 2,087 feet.

DESCRIPTION OF THE COUNTRY.

The narrow isthmus through which the Haulover Canal passes is a low and almost level wind-swept plain, which extends from the great Turnbull Swamp, at the head of Indian River, to the marshes at the north of Merritt's Island. It is covered with a scanty growth of saw palmetto and grass, with occasional solitary palms and patches of oak scrub and small hummocks. It is underlaid throughout its whole extent with coquina rock, which often crops out on the surface. That this rocky barrier is continuous is proved by the numerous outcrops just mentioned, and by the excavations for wells and other purposes made in several places by the settlers, which I have examined, and is also shown in the ditch surrounding Old Fort Ann. The elevation of this isthmus is nowhere more than 8 or 9 feet, and the plain appears to be almost level, dipping slightly towards Mosquito Lagoon.

The underlying coquina rock, belonging to the post-tertiary deposits, is simply a conglomeration of small shells, more or less broken and comminuted, and cemented with a variable degree of hardness. The upper layers of this rock are the most finely comminuted and the hardest. Descending, the character of the rock gradually changes, growing coarser and losing its cementing qualities, until at a varying depth of from 4 to 6 feet it loses the character of rock entirely and becomes only a homogeneous assemblage of shells, more or less broken and rotten. The bottom of Indian River and Mosquito Lagoon consists of sand and finely comminuted shell. In Haulover Bay the bottom is muddy. This bay and Indian River, and the salt marsh separating them, is underlaid with coquina rock and hard shell at a depth below the bottom of from 2.3 to 5.6 feet, and gradually dips to the west until at a distance of 4,300 feet from the shore it disappears. In Mosquito Lagoon rock was encountered in only one place in the seven borings taken, and then at a depth of 3.7 feet below the bottom and 500 feet from the west shore of the lagoon. A stratum of marsh mud and clay was found to exist in the Mosquito Lagoon at a depth of 4.8 to 3.7 feet below the bottom, 1,460 feet out from the shore, when it dips suddenly to the east, and at 1,980 feet from shore, where the last boring was taken, is 6.8 feet below the bottom of the lagoon.

DESCRIPTION OF THE SURVEY.

Immediately upon the receipt of your instructions I organized a party at Titusville for the purpose of making the necessary surveys and soundings. Upon the fact becoming known I was waited upon by several of the principal citizens of Titusville and vicinity, all deeply interested in the proposed improvement, and suggesting the examination of additional routes.

As the locality is practically accessible only by water, I chartered the 3-ton sloop Belle, of Indian River, for our conveyance to the canal, which is situated 9 miles in a northeast direction from Titusville.

Upon my arrival there I at once established a gauge on Futch's wharf, in Haulover Bay of Indian River, just north of the canal, at its present western end, and another in the eastern end of the canal near Mosquito Lagoon. I ran a transit line from Mosquito Lagoon to Indian River and took levels and cross-sections of the present canal every 100 feet. I then ran a double line of soundings on the axis of the canal in Mosquito Lagoon to a depth of 5.8 feet at mean low-water, as determined by the United States Coast Survey, and a corresponding line across the Haulover Bay and in Indian River.

Borings were taken on these lines at intervals of about 200 feet, and also through the present canal. I also took soundings and borings on the other lines in Haulover Bay, shown on the accompanying plan, to establish the best location of a cross-dam.

I also observed the velocity of the current in the present canal during the prevalence of a heavy northeast storm, at which time the water in Mosquito Lagoon was 20 inches higher than the water of Indian River at the gauge at Futch's wharf, and the velocity observed was 2.8 miles per hour. The prosecution of this survey was seriously retarded by a succession of severe rain storms and squalls, at one time giving

grave apprehension of a cyclone such as occurred the previous year on this coast, and which was very destructive in its effects on the Indian River. My party, with one exception besides myself, were forced to take refuge in an adjoining settler's house for several nights, as my tents threatened to blow down at any moment, although pitched in a sheltered position.

During a lull in the storm and while the water was too rough for soundings, I made a personal examination of the isthmus, on both sides and in the middle, as far north as Whatton's place (shown on accompanying chart of comparative soundings), and as far south as the Dummett orange grove, belonging to the Duke de Castellucia (which is also shown on the chart), for the purpose of deciding upon the advisability of a change of location for the new canal, as suggested by many of the citizens before referred to and ordered in your second letter of instructions.

These examinations disclosed the facts that a better location for the canal exists about a mile to the north, just south of Crook's house, shown on the chart. The width of the isthmus at this place is practically the same, between the high-water lines, and there is no marsh, as exists in front of the western end of the present canal. The distance between the 5-foot curves is half a mile shorter at this point than where the canal is now located, but the profile is essentially the same, and rock underlies the whole isthmus, as is found by the outcrops. If the original location of the canal had been made at this point it would have possessed the slight advantage in the depth of water over its present location, and the general alignment of the inland coast navigation would have been better, but with the present cut existing I do not consider a change of location advisable, as the amount already excavated and the advantages which the present cut affords of presenting a continuous curtain which can be assailed its entire length, and in which dredge-boats and scows can be operated, far outweigh the minor advantages of any other route, even without considering the fact that a reservation has been declared on each side of the present canal.

From data furnished me by the Superintendent of the United States Coast Survey, I was enabled to find the stone bench-mark set by the Coast Survey, and torefer my soundings and borings to this Coast Survey datum of mean low-water. This bench is a coquina stone 6″ by 6″ by 28″. The mark is the center of a wooden plug driven in horizontally about six inches below the top, which plug is 0.6 of a foot above the plane of reference mean low-water. The stone was originally buried in the bank 6 feet from the high-water mark, but it is now several feet in the water, owing to the washing away of the shore. It is situated in a small cove on the east side of Haulover Bay, about half-way between Sykes' and Jackson's wharves. It was found after a hard search.

My survey established the following facts: The present length of the canal from high-water on Mosquito Lagoon to high-water on Haulover Bay, Indian River, is 2,087 feet. The length of dredging required to establish a channel 4.5 feet deep in Mosquito Lagoon is 1,880 feet, and the same in Haulover Bay through the salt marsh, and in Indian River, is 5,020 feet.

The profile shows an extreme height of the natural surface of the ground above the bottom grade of the proposed canal of 12.60 feet, with an average cut of about 10.50 feet. Rock is encountered for a distance of 1,370 feet in the cut, and averages 4 to 5 feet in thickness. In Indian River there is a rock cut of 1,170 feet, and averaging 4 inches in depth, required to obtain a depth of 4.5 feet at mean low-water. The water is lowered by the winds 2 feet below mean low-water, and sometimes raised to a height of 4.50 feet, and probably more, during storms at the end of the rainy season.

PREVIOUS SURVEYS AT THE LOCALITY AND OBSERVATIONS.

I first visited this canal in February, 1869, in a tour through the State, making collections of natural history for the Museum of Comparative Zoology of Harvard University, Cambridge, Mass. At that time I camped upon its banks, and passed through it in a small boat with great difficulty. Then there were only a dozen settlers within a radius of 20 miles. Now there are over that number within 2 miles. The canal was little used, and had been suffered to become nearly choked up by the caving in of large masses of rock from the sides. At that time the small channel leading from the mouth of the canal to deep water in Mosquito Lagoon ran out in a southeast direction. It now runs out in a northeast direction. There was a low line of stone riprap extending nearly 100 yards into the lagoon, placed on the north side of the line of the canal produced, evidently intended as a jetty for the purpose of preserving a deep channel. This purpose, however, it failed to accomplish. There was no channel on the line of the canal, and the stones were nearly covered up by sand.

No trace existed of the channels included in the estimate of Lieutenant (now General) H. G. Wright, in his report to General Totten in 1853.

At low-water a shoal existed in front of the canal in Mosquito Lagoon.

In 1878 I passed through the canal on a reconnoissance for the Peabody Museum of

Archæology and Ethnology of Harvard University. The canal had been cleared out by private parties, and would pass boats of 11 feet beam and drawing 16 to 18 inches.

The small channel in Mosquito Lagoon from the canal mouth to deep-water ran out in a northeast direction. The stone riprap on the north side of the axis of the canal had almost entirely disappeared, being covered up by the sand. Marsh grass was beginning to grow on the shoal at the east end, and there was a large shoal at the west end in Haulover Bay. In 1880 I again visited the locality, and made a survey in the vicinity, and observed the extreme low-water shown on the accompanying profile.

It appears by comparison of the 4 and 5-foot curves on the chart of comparative soundings, transmitted with the soundings taken on my survey, that those curves in Indian River have moved in about one-fourth of a mile nearer the shore than they were at the time the coast survey was made. The 4-foot curve now shows a depth of 5 feet, and the 5-foot curve a depth of 5.10. In Mosquito Lagoon the same action appears to be taking place.

The 4-foot curve now shows a depth of 5.6, and the 5-foot curve a depth of about 5.8.

The material brought out of the canal is plainly discernible in the contours of the bottom.

In comparing the soundings taken by Lieutenant Blake in 1845, the only benchmark available for comparison is the profile of the cut. His profile shows a height of 8.2 feet, at the highest point, above the water-line. Mine shows 8.10. From this it appears that the water was at about the same height as when his soundings were taken. From his chart it appears that the distance from shore to 4 feet of water in 1845 was 1,610 feet. In 1881 it was 1,675. In 1845 it was 2,100 feet out to 5 feet depth of water. Now it is 1,870 feet. This shows a slight increase in depth. The more rapid increase from the Coast Survey soundings is probably due to the washing away of the material brought out of the cut, which material appears to have been higher when the coast survey was made. It also appears by the surveys that a gradual waste of 4.62 feet per year has taken place in the eight years between Lieutenant Blake's and Lieutenant (now General) Wright's survey. In the twenty-eight succeeding, a loss of 2.25 feet per year is shown. This waste of the shore is confirmed by the position of the Coast Survey bench before referred to, and has been observed by me in many places in the vicinity, by reference to the government corners of the land surveys.

RESERVATION.

In October, 1880, I was appointed a United States deputy surveyor, and made a survey of a reservation 1,000 feet wide on each side from the center line of the canal, marking the boundaries with stone posts sunk in the ground and with earth mounds, as prescribed in the manual of instructions to the United States deputy surveyors.

This survey was accepted. It was not extended over the land of Andrew Jackson and none of his land was included in the reservation, by order of the Hon. Le Roy D. Ball, United States Surveyor-General.

I am informed, however, by letter of the 7th instant, from the Hon. N. C. McFarland, United States Commissioner of the General Land-Office, "that as the canal is an important one" it has been decided to include this additional land in the reservation, and orders have been given for its survey.

The reservation was declared by proclamation of the President of the United States, August 26, 1880, and includes land held under the homestead act by Henry D. Sykes and William E. Futch, as shown on the plan of the canal accompanying this report.

These entries of land were made under the homestead law prior to the date of the order for reservation, and a "final certificate" has been issued to Henry D. Sykes, who has resided on the land and complied with the law. In the case of Wm. E. Futch, who had entered fractional section 30 under the homestead law before the order of reservation was made, he has built a house and set out an orange grove, and lived on and cultivated the land in good faith, as the law provides, but not long enough to have received a final certificate.

Andrew Jackson, over whose land the survey is to be extended, holds a patent from the United States for his land, under the homestead act.

As this land is held by law by the settlers, it is evident that the United States is bound to reimburse them for the land taken for right of way.

As no appraisement of the land has yet been made it is impossible to say what the amount of land damages will be, but from the nature of the improvements and the prices brought by other orange groves sold in the immediate vicinity it is probable that they will reach the sum of $10,000, even if they do not exceed it, including the land to be included in the reservation now belonging to Andrew Jackson.

For more particular data regarding the amount of land taken from each person, reference is hereby made to my plan of the "Haulover Canal Reservation, made by order of Le Roy D. Ball, United States surveyor-general of Florida, on a scale of 100 feet to 1 inch," and transmitted with my report and field notes of survey.

PREVIOUS EFFORTS BY THE INHABITANTS TO ESTABLISH A NAVIGABLE CHANNEL THROUGH THE HAULOVER.

In the spring of 1879 I was consulted by several of the most enterprising citizens of Titusville and vicinity, and particularly by Mr. H. F. Hammond, of Lake Worth, Fla., a gentleman owning a large cocoanut grove on the shores of that lake, and one much interested in the inland navigation on the east coast of Florida, upon the cost and feasibility of widening the existing passage to a width of 25 feet and a depth of 3 feet. Estimates were made based upon such data as was afforded by the United States Coast Survey charts of the inside passage, east coast of Florida, and the land maps of the locality, supplemented by a personal examination, and Mr. Hammond's endeavors to obtain the gratuitous co-operation of the people living on the coast from Daytona on the Halifax River to Lake Worth; but while all agreed in the importance and desirability of the improvement, the attempt was unsuccessful, as it was the general belief that an adequate improvement, such as was demanded by the trade of the region, was beyond the power of private enterprise and the means of the people.

In the summer of 1880 several meetings of the citizens of Port Orange and Daytona were held at the latter place, to consider the widening of the present canal to a width of 25 feet and a depth of 3 feet.

A survey was made and estimates prepared of the contemplated work, and I was appointed a member of a sub-committee to collect contributions to enable the work to be done. The following circular and report of the engineer was printed and largely distributed among the people of the east coast, asking all to aid in the enterprise.

CIRCULAR.

"DAYTONA, FLA., *October* 30, 1880.

"We, the executive committee, appointed by a meeting of the citizens of the coast, for the purpose of taking steps to secure the opening of a navigable channel between Hillsboro' River and Indian River, would submit to you our plan of work and invite your cordial co-operation and aid.

"Annexed hereto you will find the report of a special committee appointed to survey and examine the proposed improvement, as well as their estimate of the cost, which is believed to be ample for the work.

"It is now proposed that sub-committees shall be appointed at each precinct on the Halifax, Hillsboro', and Indian rivers, to solicit subscriptions in either cash or specified parts of the work, and at the same time this circular will be sent to all who we believe will aid us.

"On the first Monday of December this committee will meet for the purpose of receiving the reports of the sub-committees on subscriptions, together with the responses from non-residents, when, if it is found that enough has been subscribed to make the improvement, the work will be pushed forward at once.

"It is fully believed by this committee, and was the unanimous sentiment of the meeting which appointed us, that, with this improvement made, the business of the country thus joined would be sufficient and ample to secure to the entire section that which we all need—*transportation*—as it would then pay both an outside and inside steamer.

"We trust that you will join with us in the work, and if so, that you will at once notify either member of the committee what amount you will subscribe, with the understanding that you will not be called upon for your subscription unless the full amount needed is subscribed, when you will be notified, and it will then be expected that you remit at once, so as to enable the work to be commenced and pushed to an early completion.

"WM. JACKSON,
"D. D. ROGERS,
"R. S. SHELDON,
Committee."

REPORT OF THE SPECIAL COMMITTEE.

"GENTLEMEN: The committee to whom was referred the matter of surveying and making a thorough examination, and calculating the probable cost of widening and deepening the Haulover Canal to the width of 25 feet and depth of not less than 3 feet, would most respectfully report to your committee that we have complied with your request, and we find it necessary to extend either end of the canal, on the lagoon side 1,400 feet, and Indian River, 2,400, making the total length of the canal 6,000 feet. We find it the most practicable to widen all on one side, and that the north; and in removing the rock we suggest it be placed on the line of the south side extended into the lagoon, as we find it necessary to build a breakwater, and we would respectfully recommend the same to your committee. The remaining distance of 400 to deep water n the lagoon on the south side, the north side opposite, and 1,200 feet from the marsh

to deep water in Indian River, also the north side from the main land to the marsh, we would recommend to be piled with 'close piling,' good hard cabbage logs, 10 to 12 feet long; between the last-mentioned places, on the south side, we recommend be filled with dredgings and loose rock, deposited a few feet off the true line and parallel with the same; either end of the canal we recommend be enlarged so that the entrance will be 50 feet in width.

"A synopsis of our calculations is as follows:

"Rock excavation	$400
"Sand " (above high-water)	600
"Dredging	1,900
"Piles, and driving same	600
"Total	3,500

"We have been liberal in our estimate, and believe that the work can be done for less, but it depends somewhat upon the manner in which the work is carried on, and have endeavored to remember the disadvantages that we are subject to. We believe the work to be practicable, and would recommend that the work be carried on at an early date.

"We are, yours, very respectfully,

"DAVID D. ROGERS,
"*Civil Engineer.*
"LAWRENCE THOMPSON
"G. M. WALLACE.

"To the EXECUTIVE COMMITTEE
of the proposed improvement in Haulover Canal."

This appeal met with indifferent success, as it was universally believed by the people that the estimates were much too small, and that the proposed width of 25 feet was inadequate to their wants.

It resulted in raising only a few hundred dollars, mainly contributed by parties desirous of running trade boats from Daytona to Indian River. This amount was expended in deepening the existing channel, removing fragments of the ledge that had fallen in and were obstructing the channel, and cutting away a few projecting points of rock, so as to enable a boat of 14-feet beam to pass through the canal under favorable circumstances.

I was also requested by the chairman of the meeting to correspond with the United States Engineer Department, to ascertain if the aid of the general government could not be invoked to assist the enterprise. In compliance with this request I addressed a letter to you upon the subject, and transmitted the information contained in your reply to the chairman.

Last spring Mr. J. M. Kreamer, the engineer of the Atlantic and Gulf Coast Canal and Okeechobee Land Company, made an examination of the isthmus in the interest of his company, between Indian River and Mosquito Lagoon, taking some borings, and reported in favor of a canal 44 feet wide at the base, with side slopes of 2 to 1. He thinks it will be necessary to have guard-gates or locks in the canal, to control the water when the levels of the respective lagoons are disturbed by the wind.

In 1879 a charter was granted by the State of Florida to Phineas D. Wesson and associates, of Titusville, Florida, under the name of the Haulover Tram Railroad Company, for a railroad across the divide for transporting boats and merchandise.

Nothing has ever been done by any of these companies.

IMPROVEMENT PROPOSED.

From the data obtained in the surveys and examinations, and from observation and study of the locality and an intimate personal acquaintance with the needs of the Indian River country, I respectfully recommend the following improvement:

The widening of the existing canal to a width of 60 feet on the bottom, and a depth of 4.5 feet below mean low-water of the United States Coast Survey, with side slopes in loose shell and sand of 2 to 1, and in rock cutting of $\frac{1}{4}$ to 1. The excavation to be mainly made upon the north side of the present canal. Both sides to be trimmed and sloped with the foregoing slopes, as shown on the three plates of cross-sections herewith transmitted.

The banks of the present canal are undermined by the action of the current in the formation of loose shell below the rock, in some places 6 to 8 feet.

For this reason, and to prevent subsequent caving and to straighten the canal on the south side, I recommend that the banks be trimmed and sloped and protected with riprap on both sides through the land cut from the bottom of the canal to a height of 4 feet above mean low-water, with broken rock taken from the cut, except in places where the rock itself is sufficiently hard.

This is shown to be necessary by the action of the water in undermining the sides

and washing away the banks, as it has done, until a cross-section, which was originally 12 feet at the water-level in 1853 through the sand cut, is now 25 and 26 feet. This material has been taken out by the current and deposited in a bar at both ends of the canal.

Owing to the very strong current, at times exceeding 2.8 miles per hour, flowing through the canal, sometimes in one direction and sometimes in the opposite, and the lateral exposure to the sweep of the prevalent very strong north winds, making navigation by boats or other vessels with much top hamper through the canal difficult, I have given the canal somewhat larger dimensions than I otherwise would. Rankine's formula, "*greatest width of boat* × 2," gives results larger than would be absolutely required in this place were it not for the oftentimes strong current and the other conditions mentioned as existing. The shorter time required to produce an equilibrium between the lagoons with a large cross-section should also not be overlooked. It is confidently believed that upon the opening of this canal a line of steamers will be at once put on to traverse between Daytona and other points on the Halifax and Indian rivers, connecting with a steamer at Port Orange or New Smyrna from Jacksonville or Savannah. These steamers would probably have a beam of 25 to 30 feet and draw 3 to 4 feet when loaded, and a depth of 4.5 feet below Coast Survey datum is consequently recommended for the canal to make it navigable at the lower stages of water. Several steamboatmen with whom I have conversed are desirous of establishing such a route as soon as the canal is opened. Dredging of the same width and depth will be required in Mosquito Lagoon for a distance of 1,880 feet from shore, as shown on the profile transmitted, and through Haulover Bay and in Indian River for a distance of 5,020 feet from the west end of the land cut. The material to be dredged is sand and finely comminuted shells. There will be a rock cut in the bottom of the dredged channel in Indian River for a distance of 1,170 feet, averaging about 4 inches in depth.

These dredged channels in Mosquito Lagoon and Indian River will require parallel submerged jetties to be placed 100 feet apart to keep them open. These jetties I recommend to be carried out to a depth of 5.8 feet in Mosquito Lagoon, which will give a length of 2,120 feet.

In the Haulover Bay I think the jetties can be dispensed with, and would substitute a cross-dam, 610 feet long, across the narrowest place in the bay, just south of the canal, and in the position shown on the accompanying plan.

In Indian River, beginning at the west shore of the marsh, parallel submerged jetties will be required, of a length of 4,050 feet, or to a depth of 4.8 feet, as shown.

These jetties are shown to be necessary by the action of the water in filling the cuts mentioned by Lieutenant (now General) H. G. Wright, in his report before referred to. I am also informed by the residents in the vicinity that channels have frequently been dug out in the lagoon and Haulover Bay, but they were quickly filled up, and no trace of them exists to-day.

Among these is the channel said to have been dug in Haulover Bay to float the Coast Survey sloop Steadfast, which was hauled across the isthmus in 1875.

The *single line* of riprap thrown down on the north side of the canal axis in the lagoon was an imperfect and quite inadequate attempt at jettying, and it is not surprising that it was a failure. There is probably no littoral current in either Indian River or Mosquito Lagoon at this locality, but the long reaches of shoal water extending out from each shore are subject to violent wave action on a small scale, during the prevalence of "northers," and other strong winds, which it is believed would certainly soon fill any unprotected cut, especially when it is remembered that the prevailing winds are from the north and southeast, nearly transverse to the necessary line of the cuts.

The sand-bars forming at the ends of the canal are unquestionably composed of material washed from the banks of the canal.

With the banks protected with riprap, and by a bottom of loose rock or hard shell, as is generally the case through the present cut, I do not think much material will be found for the current to transport and deposit in bars at the ends of the jetties.

If, in time, however, such should prove to be the case, it might be necessary to further protect the bottom and sides with riprap. I have observed, however, that such bars are generally formed some little distance from the end of the jetty, or where the water begins sensibly to lose its velocity. In deep water this leaves a channel on the right or left side, or both, between the jetty end and the deposit, with an abrupt turn into the channel.

The fact that there will be abundance of stone in the excavated prism of the canal to build these jetties, which would otherwise go to waste, reduces the cost of them very much.

I have estimated for jetties built of close-driven double row of palmetto logs, averaging 10 feet long, cut off 1 foot below mean low-water, and find that jetties of this description will cost much more than the mattress and stone jetty, such as you are so successfully using at Saint John's Bar, Volusia Bar, and other places, provided the stone used is taken from the cut. This is estimating the piles at 40 cents each, delivered,

and 40 cents apiece additional for driving—a low estimate—but I was informed by reliable parties there that they would enter into a contract to supply them at that price, and some parties mentioned even lower figures. An ordinary wood-chopper can fell and cut into 10-foot lengths 70 to 80 such piles in a day, as has been done on Indian River by persons building wharves. On the Indian River end, piles cannot be driven on account of the rock.

This coquina rock is nearly of the specific gravity of limestone, and in *this locality* will, in my opinion, answer as well as any.

Pine logs or palmetto logs can be obtained for mattresses on the west side of Indian River, a distance of 5½ or 6 miles, and abundance of brush can be obtained within a couple of miles of the canal on the isthmus.

There will be 14,972 cubic yards of rock excavation. Of this, 1,665 cubic yards will be taken from the dredged channel between the jetties on Indian River.

I have estimated the jetties in Mosquito Lagoon at a width of 6 feet at the shore end and 14 feet at the outer end. In Indian River, where the jetties are less exposed to long reaches of the prevailing winds, I have estimated them with a width of 6 feet at the shore ends, and for the cross-dam I consider 8 feet in width to be ample in so sheltered a position.

At these widths there is required for the—

	Cubic yards.
Mosquito Lagoon jetties, stone	1,836.3
Indian River jetties, stone	3,086.2
Cross-dam jetties, stone	180.7
Making a total of stone of	5,103.2

Of this amount, 1,665 cubic yards will be taken from the cut between the jetties, and it will be only necessary to lay it upon the mattresses.

There will be apparently a surplus of 9,868.8 cubic yards of stone more than is required for the jetties and cross-dam, estimating for only one course of mattresses, 30 inches thick, and the top of the jetty to be 1 foot below level of mean low-water, where deep enough, except at the cross-dam, which should be one-half foot above mean low-water.

The actual surplus, however, after deducting 971.9 cubic yards for riprap, owing to the friable and decomposed character of much of the rock, will be probably very little if any. The dredgings and this shell and disintegrated rock can be advantageously placed on the back or outside of the jetties, serving to strengthen them and rendering the dimensions assumed above ample. Some of it can be used to advantage also to protect the sides of the dredged channels.

The character of the rock is such that very little, if any, will require blasting. Where covered with water or damp earth, it is soft and can be easily cut out with an ax or dislodged with picks. Upon exposure to the atmosphere, however, it becomes very hard. I do not believe that any guard gates or locks will be required in the canal. It would be advisable, however, to make a tow-path on one side, at top, in order that boats and sailing vessels may be towed against the current, which, as a general rule, seldom runs in the same direction more than two or three days at a time, and then is only strong enough to cause trouble during the prevalence of very severe northers or long-continued southeast winds, except in floods or after a cyclone.

If in the future it is found that locks are required they can be built as well as now. In view of the character of the rock, and the fact of the existence of the present cut, presenting a continuous face for work and allowing narrow scows to load directly from the bank, I think my estimates herewith presented are ample, and will not be exceeded.

ESTIMATE OF COST.

Earth work:		
Excavations of sand and shell between Mosquito Lagoon and Indian River, 37,892 cubic yards, at 20 cents		$7,578 40
Dredging in Mosquito Lagoon, 10,689 cubic yards, at 20 cents		2,137 80
Dredging in Indian River, 21,445 cubic yards, at 20 cents		4,289 00
		14,005 20
Rock work:		
In Indian River, 1,665 cubic yards, excavated and placed on jetty, at $2	$3,330 00	
Between Indian River and Mosquito Lagoon, ditto, 13,307 cubic yards, at $1.50	19,960 50	
		23,290 50
Mosquito Lagoon jetties:		
4,711.1 square yards mattress 30 inches thick, at $1		4,711 10
Indian River jetties:		
8,100 square yards mattress 30 inches thick, at $1		8,100 00

Cross-dam:	
542.22 square yards mattress 30 inches thick, at $1	$542 22
Riprap:	
971.9 cubic yards laying one-half from dump and one-half taken from cut, at 20 cents	194 38
	50,843 40
Contingencies and superintendence, 10 per cent.	5,084 34
	55,927 74
Add for land damages, approximated	10,000 00
Total	65,927 74

It is recommended that palmetto logs be used in the mattresses, and mangrove brush or palmetto, all of which are very abundant, in the place of oak brush, to avoid injury from worms. This will insure permanency in the work.

The best method of doing the work will be, to first build the mattresses in position and load them with only sufficient stone, taken from the cut at the time, to sink them. After the mattresses are all laid the dredging and excavation can go on simultaneously and the mattresses be loaded with their full quota of stone, and the top of the jetties brought up to grade. Half the stone required for riprap will have to be dumped—that is, the riprap required for the north side of the land cut—and taken from the dump and laid upon the completion of the side slopes on the north side. The other half can be laid upon the south bank, it only being necessary to throw it across the old canal, if the slopes of the south bank are trimmed first.

The best time of year for doing the work would be from November 1st to May 1st. After the latter date the mosquitoes would be found very troublesome, and during June, July, August, and September, almost unbearable. This place has the reputation of being the worst for mosquitoes on the whole east coast, and my experience confirms it.

The work would require the best part of two working seasons to complete.

COUNTRY AND POPULATION TO BE BENEFITED.

The country directly benefited by the construction of this canal embraces the whole of the east coast south of the canal and to the southern extremity of Lake Worth, a distance of 160 miles. The coast country north of the canal to the northern extremity of Bulo's Creek, a distance of 60 miles, will be also indirectly benefited, inasmuch as with this canal opened for steamboat navigation a sufficient amount of freight could be collected at Mosquito Inlet to amply repay a regular line of steamers from that inlet to Savannah or Jacksonville, a condition of things that without it does not exist.

The population of the east coast south of this canal to the lower extremity of Lake Worth, as given by the last census, is about 1,600. The population north of the canal that would be indirectly benefited is about 1,800. This population is constantly increasing, and the country only needs an outlet for its productions to encourage planters and enable it to receive a large share of the great immigration now entering the State.

Abundance of good land awaits the settler on Indian River, and the oranges from this section already have the highest reputation of any in the State. There are thirteen stores below the canal on Indian River, and eight post-offices.

As this region is comparatively unknown and generally supposed to be given over to alligators and mosquitoes, I will quote from my report on the Indian River and tributary country, made in 1880 to the Saint John's and Indian River Railroad Company. It appears that at that time there were the following orange groves, and other plantations on the Indian River and at Lake Worth, viz:

"Two hundred and four orange groves, containing 87,000 trees, of which 15,000 are now bearing. There are 220,000 pine-apples, of which one-half are at Lake Worth, and about half this number of bananas.

"There are 20 cocoanut groves at Lake Worth, containing 12,000 cocoanut palms.

"To these should be added an almost innumerable number of guavas, limes, lemons, and various other tropical fruits, such as sugar apples, mangoes, olives, dates, grapefruit, grapes, West Indian papaw, sapodillo, cherimoyer, &c., &c.

"Large amounts of sugar-cane, sweet and Irish potatoes, early tomatoes, and other early vegetables, are raised, and the vegetables are ready to be shipped to the North in February and March."

The present amount of trade to and from Indian River is very difficult to determine with accuracy. Blanks to be filled out with the amounts of freight carried by the steamers on the Upper Saint John's above Enterprise, for the last year, have been sent by me to the steamboat owners whose vessels ply on that route, but have remained unanswered. Some of the Indian River freight is sent via New Smyrna and Mosquito

U. S. Engineer Office,
New York, Dec. 3, 1881.

Sent to the Chief of Engineers with my report of this date.

2. A. Gillmore
Lt. Col. Engrs. Bvt. Maj. Genl. U.S.A.

COMPARATIVE CHART

of the vicinity of

HAULOVER CANAL, FLORIDA.

From U.S. Coast Survey Charts, with additions.
Curves from Coast Survey 1877
Soundings from a Survey made in August, 1881
under the direction of

Bvt. Maj. Gen. Q.A. Gillmore, Lt. Col. of Engrs, U.S.A.
by J.F. LeBaron, Asst. Eng'r.

SCALE.
1/4 1/2 3/4 1 MILE

28° 45'
44'
43'
42'
48'
47'
46'
80° 45'
44'
43'
28° 45'
44
42'
43'
41'
48'
47'
46'
80° 45'
44'
43'

True Meridian.
Magnetic Meridian.
VARIATION 2° 03' AUG. 1881.
N
S
W
E

INDIAN RIVER

ITO LAGOON

MUSQUITO

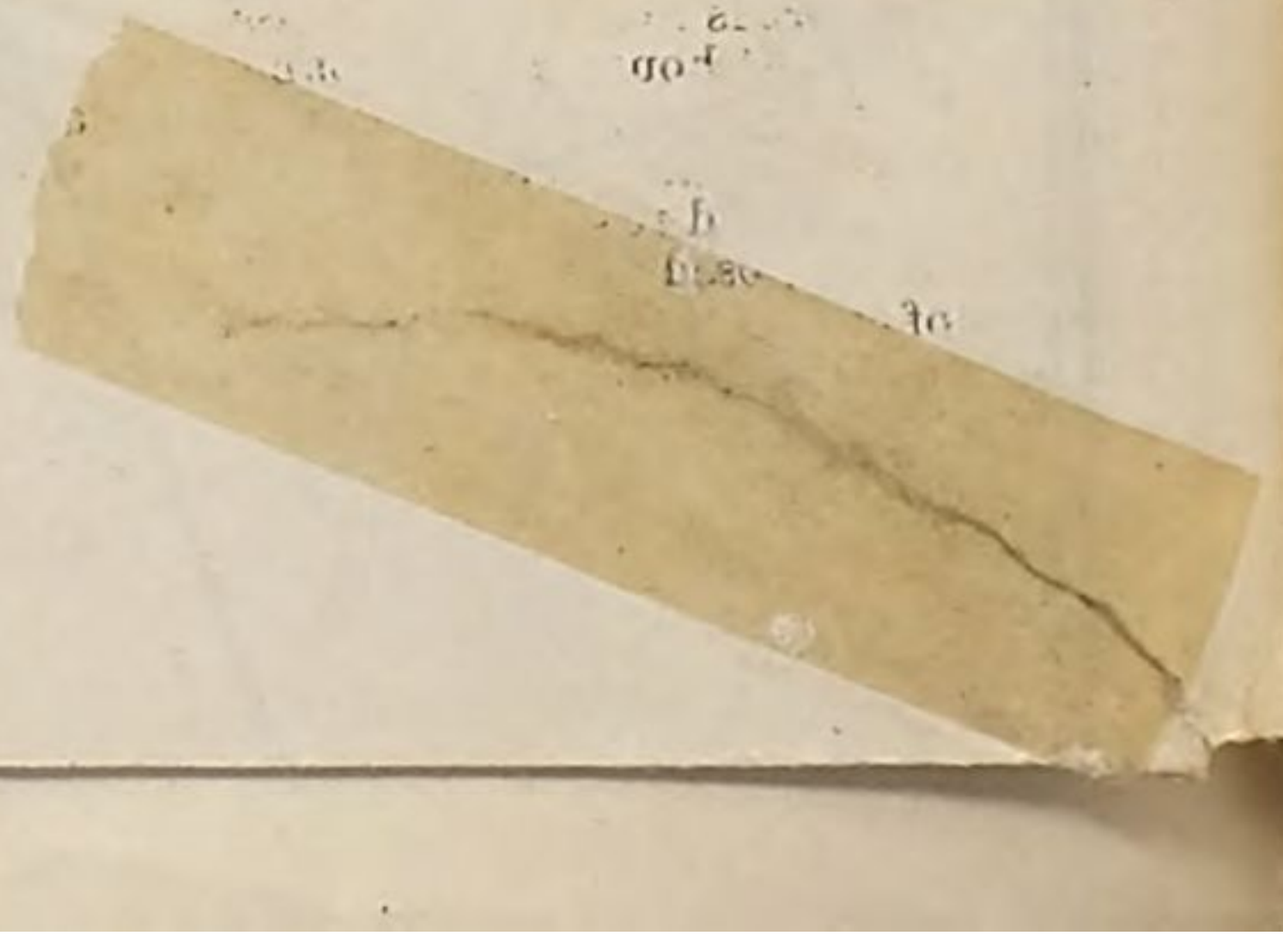
T. 20 S., R. 35 E.
T. 20 S., R. 36 E.
T. 21 S., R. 36 E.

13
24
19
30
29
31
32
1
6

W. H. Watton
B. Campbell
J.D. Vann
T. Crook
D.G. Hunt
Futch
HAULOVER CANAL
H.D. Sykes
A. Jackson
R.U. Wright
C.H. Nauman
DUMMET'S CREEK
Dummet Grove
Duke de Castellucia

6FT
5FT
4 FT
3FT

SEN. EX. DOC. No. 33, 1st SESS., 47th CONG.



Inlet through the existing Haulover Canal, but the larger part, at present, crosses the divide from Indian River to the Saint John's either at Titusville to Salt Lake Landing, on the Saint John's, or at Rock Ledge to Lake Poinsett Landing, and follows the devious channel of the Upper Saint John's to Jacksonsville, occupying from 50 to 70 hours in transit.

The Salt Lake and Titusville Branch of the Saint John's and Indian River Railroad, 7.3 miles long, from Salt Lake to Titusville, was never laid except with temporary wooden rails and operated with mules. It is now worn out and disused, and all freight is hauled over in wagons.

In regard to the amount of productions of this region, I will quote from another report prepared by me, for the Sanford and Indian River Railroad Company, in February, 1881, on the subject of Indian River trade:

"There were shipped last year (1880) 2,000,000 oranges—equal to about 14,000 boxes. This was an unfair year for a criterion, as fully one-half the crop was blown from the trees and destroyed in the cyclone that visited that section before the oranges were ripe.

"Early vegetables, mostly tomatoes, boxes shipped	1,000
"Bananas, bunches	500
"Irish potatoes, barrels	200
"Sirup and sugar, barrels	400
"Green turtles, caught and shipped	600
"Pineapples, about	50,000
"Lemons, crates	100
"Limes, crates	50
"General merchandise, tons	700

"About 75,000 pine apples are expected to be shipped from Lake Worth this year."

This Lake Worth freight all comes via Indian River.

It is believed that nearly all the above freight would pass through the Haulover Canal, in preference to the rehandling, teaming, and extra time required by the Saint John's route, if it was opened to allow steamboat travel.

Indeed, steamers drawing 3 feet have been brought to the eastern end of the canal in Mosquito Lagoon to collect the oranges from the Dammett Grove, now belonging to the Duke de Castellucia, the production of which varies from 40,000 to 100,000 oranges and over per year.

The great desirability of this improvement and the imperative need of this section for better transportation, to furnish an outlet for their rapidly increasing productions, is greatly enhanced by the perishable natures of the freight. These orange groves and other plantations are constantly increasing. Only about one-sixth of the orange trees are as yet bearing, and the same is true of the other fruits. This entire east coast is destined, at no distant day, to support a large and prosperous population, and will present almost one continuous orange grove.

The craft at present navigating Indian River is confined to sail-boats, sloops, and small schooners, which have mostly been built on the river. There are five small schooners averaging from 40 to 45 feet long and 10 to 14 feet beam. One of these vessels makes semi-regular trips outside, from Jacksonville to Indian River Inlet with freight, being unable to pass through the present canal. The United States mail is all carried in boats on this river and is brought from Saint Augustine via Daytona, and all passes through this canal, where it is often subject to great delay.

This little cut forms an important factor in the inland coast navigation scheme for inland water communication from Saint Augustine to Biscayne Bay, which has engaged the attention of the government for many years, and the many advantages and benefits of which to commerce, navigation, and the people of the east coast of Florida, it would be superfluous for me to write.

This work is in the collection district of Saint Augustine, and Saint Augustine is the only port of entry in the district. I inclose statement of the collector of customs regarding the amount of revenue collected.

The work can be done most advantageously to the United States by contract.

The nearest fort is Fort Marion, at Saint Augustine.

The nearest light-house is Cape Canaveral.

I transmit with this report the following plans and drawings:

1 chart of comparative soundings.

1 plan of canal and reservation.

1 profile of proposed work.

3 sheets of cross-sections.

The plans and papers sent me are herewith returned.

Very respectfully, your obedient servant,

J. FRAS. LE BARON,
Assistant Engineer.

Bvt. Maj. Gen'l Q. A. GILLMORE,
Lieut. Col. of Engineers, U. S. A.

COMMERCIAL STATISTICS.

CUSTOM-HOUSE, SAINT AUGUSTINE, FLORIDA,
Collector's Office, September 5, 1881.

SIR: I have the honor to acknowledge the receipt of your letter of the 1st instant, relative to the amount of revenue received at this port for the fiscal year of 1881, and very respectfully report as follows:

Received for duties on imports	$2 40
Received on account marine hospital tax	63 64
Received on account tonnage tax	57 30
Received on account official fees	31 90
Received on account fines, penalties, &c	5 75
Received on account steamboat inspection	50 00
Exports to foreign ports:	
160 head of cattle, valued	3,300 00
Number of vessels entered and cleared (not including those within this district and Jacksonville)	22

The imports for the fiscal year of 1881, were unusually small; the imports for the fiscal year of 1880 were $125.15.

Very respectfully,

THOMAS F. HOUSE,
Collector.

J. F. LE BARON, Esq.,
United States Assistant Engineer.

47TH CONGRESS, 1st Session. } SENATE. { EX. DOC. No. 34.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING

A communication from the Chief of Engineers, dated the 23d ultimo, covering copy of report from Lieut. Col. G. H. Mendell, Corps of Engineers, upon an examination of Mokelumne River, California.

JANUARY 5, 1882.—Referred to the Committee on Commerce and ordered to be printed.

WAR DEPARTMENT,
Washington City, January 4, 1882.

The Secretary of War has the honor to transmit to the United States Senate, for the information of the Committee on Commerce, a communication from the Chief of Engineers, dated the 23d ultimo, covering copy of report from Lieut. Col. G. H. Mendell, Corps of Engineers, upon an examination of Mokelumne River, California, from Woodbridge to its mouth, made in compliance with the requirements of the river and harbor act of March 3, 1881.

ROBERT T. LINCOLN,
Secretary of War.

The PRESIDENT *pro tempore*
of the United States Senate.

OFFICE OF THE CHIEF OF ENGINEERS,
UNITED STATES ARMY,
Washington, D. C., December 23, 1881.

SIR: To comply with provisions of the river and harbor act of March 3, 1881, I have the honor to submit herewith a copy of a report to this office from Lieut. Col. G. H. Mendell, Corps of Engineers, of the results of an examination made under his direction of Mokelumne River, California, from Woodbridge to its mouth.

Very respectfully, your obedient servant,

H. G. WRIGHT,
Chief of Engineers, Brig. and Bvt. Maj. Gen.

Hon. ROBERT T. LINCOLN,
Secretary of War.

EXAMINATION OF MOKELUMNE RIVER, CALIFORNIA, FROM WOODBRIDGE TO ITS MOUTH.

UNITED STATES ENGINEER OFFICE,
San Francisco, Cal., December 7, 1881.

GENERAL: I have the honor to submit the following report upon an examination of the Mokelumne River, California, from Woodbridge to its mouth, as required by the act of Congress approved March 3, 1881.

In May I made an examination of the portion of the river from Galt Ferry to New Hope Landing, for the purpose of ascertaining the requirements of the case, and of determining what would be necessary in the way of further examination or survey.

This examination proved that there was no real necessity for an instrumental survey, and that a careful examination without the aid of instruments would be sufficient for the purpose of estimating the cost of improvements.

Mr. C. D. Rhodes, assistant engineer on the improvement of the San Joaquin River, made a detailed examination in October. A copy of his report is appended. The views therein expressed as to the character of the improvement agree with those formed by me on a partial examination.

The Mokelumne River is a tributary of the San Joaquin, which it enters about 20 miles above the mouth of the latter. The San Joaquin and the channels through Suisun and San Pablo bays afford good navigation from the mouth of the Mokelumne to San Francisco.

The Mokelumne River drains about 600 square miles of territory, and during the rainy season, and also during the spring, while the melting snow on the Sierra is in process of being drained, it carries a large quantity of water. At other periods of the year the drainage water decreases, attaining a minimum considerably less than 100 cubic feet per second.

In the lower part of its course, and a few miles below Woodbridge, it enters the marshy district which borders the San Joaquin River, and begins to be subject to tidal influence. This circumstance makes the stream navigable in its lower part. Above, the deficiency of water in parts of the year, and the great fall at all times, forbid navigation.

Galt Ferry, just below the mouth of Dry Creek, and 10 miles below Woodbridge, is the head of practicable navigation. It would be unwise to attempt to make the river navigable above this point.

Below this point navigation is now possible, and actually exists.

Following down stream below Galt Ferry the channel presents the character of an estuary, the sectional area increasing to the junction with the San Joaquin.

About 6 miles below Galt Ferry, and at New Hope Landing, the channel, which for this distance is single, joins two other channels, called respectively the North and South forks, which unite again about 4 miles before reaching the San Joaquin. Staten Island lies between the forks.

The length of the North Fork is 9 miles, and of the South Fork is 14 miles.

From Galt Ferry to the San Joaquin, by way of the North Fork, is 19 miles, and by way of the South Fork is 24 miles, and the total length of navigable channel, including both forks, is 33 miles.

In the lower part of their course the forks are large tidal corals several hundred feet in width, with all requisite depth for the requirements of navigation, present or future, as far as can now be foreseen.

The main obstructions occur in the upper few miles, and consist principally of snags and overhanging trees.

The views expressed by Mr. Rhodes as to the amount of freight to be carried express the opinions of intelligent citizens interested in the adjoining country.

As far as can now be judged, this channel once put in good condition would not require in future more than occasional attention.

The clearance of the river could be best effected by the United States snag-boat Seizer, which has strength and the necessary equipment, in both of which respects it has the advantage of commercial boats.

The only shoal developed by the examination is one due to the discharge of mining detritus from the Cosumnes River, and lying just below its mouth. In its present aspect the correction of the channel at this point admits an easy solution. The effect of future deposits will be a matter for consideration upon their occurrence.

The Cosumnes is the most damaged of the southern streams from the effects of mining. (See Lieutenant Payson's report, House Ex. Doc. No. 76, 46th Congress, 3d session.) At its exit from the foot-hills, the river-bed has been obliterated by mining deposits, and for 5 or 6 miles below it has five or six times its normal width and is choked with sand and gravel. The possible consequences of future floods upon this mass of material lying in their path cannot be fully estimated at this time. They are more to be dreaded than the direct result of the limited degree of mining now existing on the Cosumnes.

The Upper Mokelumne and Dry Creek, one of its branches entering just above Galt Ferry, are receptacles of mining detritus, and they, too, may be expected to deposit material which the tidal currents will not be able to remove. The examination did not detect any injury resulting up to this time due to this cause.

Experience has shown that the removal of visible snags brings to light others, the existence of which had not previously been suspected, and therefore it is proper to estimate for a larger number than that now open to observation.

ESTIMATE.

150 snags, at $40	$6,000
Clearance of banks	500
Improvement of shoals near the Cosumnes	1,000
	7,500
Contingencies 10 per cent	750
	8,250

The amount of the estimate ought to be available in one sum.

The Mokelumne River is in the customs district of San Francisco, at which port duties were collected during the past fiscal year to the amount of 6,166,627.38.

The nearest light-house is on Mare Island and the nearest forts are those in San Francisco Harbor.

Very respectfully, your obedient servant,

G. H. MENDELL,
Lieutenant-Colonel, Corps of Engineers.

The CHIEF OF ENGINEERS, U. S. A.

REPORT OF MR. C. D. RHODES, ASSISTANT ENGINEER.

STOCKTON, *October* 22, 1881.

SIR: In accordance with the instructions contained in your letter of October 1, I have made an examination of the Mokelumne River from Woodbridge to its mouth or

junction with the San Joaquin River, including the North and South forks of the river.

Commencing at Woodbridge, I found the river very narrow and crooked, in places not over 60 feet wide between banks, and very much choked with snags, rafts of fallen trees, and overhanging brush. At the time of the examination the river-bed contained so little water that a small skiff could not be forced through, and the examination was made from the banks of the river. At a point on the river about 2¼ miles from Woodbridge, on the land owned by McNeil (see map), was the first opportunity to use the skiff. From this point for a distance of 2 miles the boat was dragged and pushed through pools of water and over sand-bars, and then taken out and carried around a dam of logs and drift wood. From this point, and as far down as Dry Creek, progress could only be made by frequently dragging the boat over drift wood and sand-bars. To this point (Dry Creek) the river is nearly dry at this season of the year and could not possibly, at any season of the year, be called a navigable stream.

About 1 mile above Dry Creek I first saw signs of a tide movement.

At Dry Creek could be seen marks of about 2 feet of tide. Immediately below Dry Creek is shoal-water with less than 1 foot at low-tide. From Dry Creek down, one-half mile or less, to the Galt Ferry, at New Hope, the river is very narrow and shallow. In this distance are five large snags, four overhanging trees, and two large rafts or dams of logs and drift material.

Galt Ferry, at New Hope, may be considered the head of navigation for even the smallest steamers. From this point, however, the river gradually improves in character, though much obstructed by snags, fallen trees, and overhanging trees.

At the mouth of the Cosumnes River, about 2¾ miles below Galt Ferry, is a bar across the river and extending down stream for an eighth of a mile to Benson's Ferry. At low-water this bar has 1 foot or less of water upon it. The full extent of rise of tide at this point does not exceed 4 feet in high tides. The bar appears to be formed by *débris* or slikens from mining on the Cosumnes River. Two or three dams of 20 or 30 feet each would probably rectify the river at this point.

Continuing down the river to New Hope Landing the river is obstructed at intervals with snags and overhanging trees, but the water increases in depth from 5 to 10 feet at low-water.

From New Hope Landing to the mouth of the river via North Fork the river is excellent; and with the exception of three snags at Miller's Ferry, at Snodgrass Slough, the river is generally free from all obstructions.

About 4 miles below Miller's Ferry are some large hard pan bowlders scattered along the bed of the river for 1,000 feet or more. The larger ones show 5 feet soundings at low-water. With a knowledge of their location they can be easily avoided.

From the mouth of the river, returning to New Hope Landing via South Fork, the river is excellent until within 1½ miles of New Hope Landing. Scattered along this last 1½ miles, there are twenty snags, twelve overhanging trees, and one raft of snags and drift wood that are complete obstructions to navigation. Naturally there is a great desire among steamboat men to have these removed, as they completely blockade the South Fork, which is otherwise a fine stream.

The obstructions which I below enumerate are the least in number that can be removed and make navigation practicable. Many others exist which can be avoided with care.

From Galt Ferry, at town of New Hope, to New Hope Landing, 79 snags, 21 overhanging trees, 7 rafts; from New Hope Landing to mouth of river via North Fork, 3 snags; from New Hope Landing to mouth of river via South Fork, 20 snags, 12 overhanging trees, 1 raft; total, 102 snags, 33 overhanging trees, 8 rafts.

The size and condition of the above obstructions may, for an estimate of cost of removal, be considered as the same as a similar number of snags recently removed in the San Joaquin River.

Regarding freight shipped on the Mokelumne River, the following items have been gathered from actual shipments by the river, and the prospective shipments deduced from actual shipments by railroad. As the freight by railroad to San Francisco is from $2.50 to $3.50 per ton, it is only a fair supposition that when the average haul to the river landings would not exceed the haul to the various railroad stations the river transports would take the freight, as the rate by water to San Francisco is but $1.00 per ton.

From the north side of the Mokelumne River, between the Cosumnes River and the Sacramento River, there would be shipped about 6,000 tons of wheat and barley, 1,000 head of hogs, cattle, &c., 300 tons of grapes, and 1,000 tons of hay. From the Galt side about 10,000 tons of wheat, 4,000 cords of wood, and an unlimited amount of coal from the Ione Mines, as the water is only 5 or 6 miles from the junction of the Ione Railroad with the Union Pacific Railroad.

The Acampo district, one of the largest wheat sections between Stockton and Sacramento, would contribute as much as the other two places, viz, north of the river and the Galt section.

On the south side of the river the wood and brick shipped at present will annually amount to 4,000 tons, but with improved navigation will run up to 30,000 tons, as the material for brickmaking is the best in the State, and all that is needed to develop the business is a clear river and a certainty of being able to ship by water hogs and cattle about 1,000 head.

There is now shipped annually about 20,000 tons of wheat, barley, beans, potatoes, and other produce from the Mokelumne River for which the San Joaquin River gets the credit.

From the above statement of tonnage obtained from Dr. Harvey, of Galt, and Mr. Arthur Thornton, of New Hope, it appears that 72,900 tons of freight would be shipped by the districts bordering on the Mokelumne River if the condition of the river would permit.

I return the tracing of the Mokelumne River, on which I have located the principal points referred to in this report, the scale of drawing being too small to locate each individual obstruction. I have made a free-hand sketch of the river as I passed over it, from which an intelligible idea could be obtained of the location of each obstruction enumerated. This is contained in a note book which I forward with this report.

Very respectfully, your obedient servant,

C. D. RHODES,
Assistant Engineer.

Lieut. Col. G. H. MENDELL,
Corps of Engineers, U. S. A.

47TH CONGRESS, 1st Session. } SENATE. { EX. DOC. No. 35.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING

A communication from the Chief of Engineers, dated the 3d instant, covering copies of reports from Maj. G. L. Gillespie, Corps of Engineers, upon examinations of the harbor of Port Henry, Lake Champlain, and of the channel between the islands of North Hero and South Hero.

JANUARY 5, 1882.—Referred to the Committee on Commerce and ordered to be printed.

WAR DEPARTMENT,
Washington City, January 4, 1882.

The Secretary of War has the honor to transmit to the United States Senate, for the information of the Committee on Commerce, a communication from the Chief of Engineers, dated the 3d instant, covering copies of reports from Maj. G. L. Gillespie, Corps of Engineers, upon examinations made in compliance with provisions in the river and harbor act of March 3, 1881, of the harbor of Port Henry, Lake Champlain, and of the channel between the islands of North Hero and South Hero, Lake Champlain.

ROBERT T. LINCOLN,
Secretary of War.

The PRESIDENT *pro tempore*
of the United States Senate.

OFFICE OF THE CHIEF OF ENGINEERS,
UNITED STATES ARMY,
Washington, D. C., January 3, 1882.

SIR: I have the honor to submit herewith copies of reports to this office from Maj. G. L. Gillespie, Corps of Engineers, of examinations made under his direction, to comply with requirements of the river and harbor act of March 3, 1881, of the harbor of Port Henry, Lake Champlain, and of the channel between the islands of North Hero and South Hero, Lake Champlain.

Very respectfully, your obedient servant,

H. G. WRIGHT,
Chief of Engineers, Brig. and Bvt. Maj. Gen.

Hon. ROBERT T. LINCOLN,
Secretary of War.

EXAMINATION OF HARBOR AT PORT HENRY, ON LAKE CHAMPLAIN.

UNITED STATES ENGINEER OFFICE,
New York, December 20, 1881.

GENERAL: In compliance with section 3 of the river and harbor act approved March 3, 1881, I have the honor to submit herewith a report upon the examination of the "harbor of Port Henry, on Lake Champlain."

The harbor of Port Henry, New York, is located on the west side of the south end of Lake Champlain, about 2 miles northwest from the head of the narrows at Crown Point. The mountains to the westward are said to be rich in iron ores of a particularly good quality, which are mined extensively, and the products brought to Port Henry for shipment in the crude state, or after reduction.

The shipments are made to Canada and to home ports by rail and by the boats which ply upon the lake. A great deal of miscellaneous merchandise is also received and shipped. During the past year the money value of all the exports and imports of the port is believed to be much in excess of that of previous years, but this can not be verified from reports by the different corporations doing business there, which are disinclined to publish to the public their private business.

The average depth of water along the docks of the Bay State Iron Company on the north side of the harbor is 12 feet, and the average depth along the other docks is 8 feet, except at or near the entrance to Mill Brook, where the depth is reduced to 4 feet by deposits of silt brought down by that stream. Owing to its location at a narrow part of the lake, and the mountainous character of the boundaries on the south and west sides, the harbor is well sheltered, except against storms from the northward which pile up heavy seas at the foot of the lake, making the anchorage dangerous and the approach to the wharves, at such times, exceedingly difficult. It is to afford protection against these northerly storms that a breakwater has been projected on the north side of the harbor, with a length sufficient to cover the front, where the necessity of protection is greatest. The breakwater is projected to be constructed of timber cribs 30 feet wide, filled with stone ballast and covered by a superstructure of equal width, whose top shall be 8 feet above average low-water. Starting at a point 800 to 1,000 feet from the shore-line and about 1,500 feet to the northward of the present steamboat wharf, the breakwater will run in a southeasterly direction a distance of 3,500 feet, where the water is approximately 35 feet deep, the average depth not exceeding 28 to 30 feet. The estimated cost of the project is $559,030.

In obedience to the requirements of section 2, act approved March 3, 1875, a survey of this harbor for a breakwater was made in 1875 by the engineer officer then in charge of the district, and a report submitted to the Chief of Engineers dated March 29, 1876, which will be found on page 261, Part I, annual report of the Chief of Engineers, 1876, and to which I respectfully invite your attention.

In this report, the officer says that—

> The position and length of the breakwater designed seem to be suitable to afford the protection asked for.

The construction of the breakwater would give a much needed protection to the industries which center at Port Henry, and as this is the most important point on the west side of the lake, I would recommend that a liberal appropriation be made for the commencement of the improvement for which an estimate is submitted.

COMMERCIAL SLATISTICS.

Port Henry is in the collection district of Champlain, N. Y. Rouse's Point is the nearest port of entry. Fort Montgomery, at the outlet of Lake Champlain, is the nearest fort, and the nearest light-house that on Crown Point.

The following statement of the district of Lake Champlain, for the fiscal year ending June 30, 1881, supplied by the courtesy of Mr. L. Moffin, collector of customs at Plattsburg, N. Y., is respectfully submitted:

	Value.	Duty.
Dutiable goods entered for consumption	$1,551,225 78	$306,187 56
Free goods entered for consumption	349,391 83	.....
Goods withdrawn from warehouse for consumption	2,659 88	4,158 06
Total for consumption	1,903,277 49	310,345 62
Value of silver coin imported	2,580 00	.....
Value of gold coin imported	1,436,000 00	.....
Goods entered for warehouse and transportation to other districts	1,311,435 00	283,884 97
Goods entered for warehouse (liquors only)	6,028 75	7,968 99
Goods entered for transportation and exportation	25,314 00	9,439 53
Totals (exclusive of specie)	1,342,777 75	301,293 49

Value of domestic exports	$2,068,095 00
Number of entrances of vessels from foreign ports	1,210
Number of clearances of vessels for foreign ports	1,292
Coastwise entrances of vessels	55
Coastwise clearances of vessels	943
Amount of tonnage tax collected	$9,975 46

The amount of commerce which will be benefited by this improvement is approximated at $2,000,000.

I am, general, very respectfully, your obedient servant,

G. L. GILLESPIE,
Major of Engineers, Bvt. Lieut. Col., U. S. A.

Brig. Gen. H. G. WRIGHT,
Chief of Engineers, U. S. A.

REPORT OF MR. D. WHITE, ASSISTANT ENGINEER.

FORT MONTGOMERY,
Rouse's Point, N. Y., November 11, 1881.

COLONEL: I have the honor to report that, in compliance with your instructions of October 6, 1881, I have made an examination of Port Henry Harbor, New York.

A series of soundings in parallel lines, extending along the harbor front, varying in length from 1,500 feet to 2 miles, to the opposite shore, have been taken, and the improvements or changes carefully observed, and as a supplement to my report on this harbor made to General John Newton, United States Engineers, January 26, 1876, and printed in the report of the Chief of Engineers for that year, I would state, as will be observed by comparing the sketch of the harbor, herewith respectfully transmitted, with the former chart, that no material changes have since taken place, save in the extension eastwardly of the embankment at the southeast corner of the Bay State Iron Company's property, by the continued deposit of slag from the iron furnaces, and a like filling at either side of the Cedar Point Iron Company's wharf near the southern end of the harbor, which, together with the soundings, will be found indicated by red lines and figures in the sketch.

The need of a breakwater at this point of the lake, in the interest of both local and general commerce, as fully set forth in my former report, remains the same.

A revision of the estimate made in the former report, on the present basis of prices

for labor and material, demonstrates the fact that no changes need be made, and I herewith submit these estimates as the estimates for this report, as follows, namely:

1,066,800 cubic feet of pine timber, at 30 cents	$320,040 00
105,000 feet, B. M., pine plank, at $25 per M	2,625 00
965,019 pounds drift bolts, at 4 cents	38,600 76
11,760 pounds 8-inch wrought spikes, at 5 cents	588 00
124,263 cubic yards rubble, at $1	124,263 00
Contingencies, 15 per cent	72,913 24
Total	559,030 00

Very respectfully, your most obedient servant,

D. WHITE,
Assistant Engineer.

Col. G. L. GILLESPIE,
Major of Engineers, U. S. A.

EXAMINATION OF THE CHANNEL BETWEEN ISLANDS OF NORTH HERO AND SOUTH HERO, LAKE CHAMPLAIN.

UNITED STATES ENGINEER OFFICE,
New York, December 27, 1881.

GENERAL: In compliance with section 3 of the river and harbor act approved March 3, 1881, I have the honor to submit herewith a report upon the examination of the "channel between the islands of North Hero and South Hero, Lake Champlain," accompanied by an estimate of the cost of the improvements deemed proper to be made in the interests of commerce. The examination was made under my direction by Assistant Engineer D. White, whose accompanying report gives a full description of the channel and its approaches.

These two islands lie wholly within the State of Vermont and on the east side of the main commercial channel through the lake. To reach Swanton Harbor by water from the Canadian route along the Richelieu River, the natural course is past Rouse's Point through the main channel on west side of Isle La Motte to opposite the North Point of Point au Roche, thence northeast through the Alburgh Passage to Meguana Bay. If the voyage is to be continued to the southern ports on either side of the lake, the proper course to follow is south along the west side of Butler's Island and out through the "gut" between the North and South Hero Islands.

This passage, or the "gut," so called, is then an important feature of the navigation affecting the commerce of the east side of Lake Champlain from Missisquoi Bay south to Sand Bar Bridge, at the south end of South Hero Island, where the passage is closed by an artificial embankment, built to facilitate traffic between the island and the Vermont shore. The "gut" is an irregular sheet of water of about 4 square miles in extent, with 10 feet of water in the center, where the channel is 4,000 feet wide at the maximum cross-section. From the center the channel contracts towards the entrance and to the outlet, but much more rapidly toward the latter than to the former. The entrance on the west side is 1,900 feet wide, but is partially closed by a bar connecting the two shores, composed of bowlders, gravel, and sand, through which there is a navigable passage only 60 feet wide. The outlet on the east side is 1,700 feet wide, and has a bar, similar to the one at the entrance, through which there is a channel 100 feet wide. The shoalest parts of the bars which lie on the north side of the contracted channels, and which spring from narrow points projecting from south end of North Hero Island, have an average width, east and west, of 600 feet. On the south side

the configuration of the shore near the bars is more nearly parallel to the channel line and the shoals are wider and longer. The waters of the lake on either side of the "gut" are exceedingly deep, and, if required, could float sea-going vessels of the largest class. If the bowlders were removed from the two bars so as to widen the channel-way to 250 feet it would seem that the improvement would be a permanent one, and would be of great benefit to boats and tows during northwesterly weather, when the waves are high, the currents strong, and the passage difficult and dangerous.

I therefore recommend that the sum of $8,000 be appropriated for the improvement, for which an estimate is submitted by Assistant Engineer White.

COMMERCIAL STATISTICS.

This passage is in the collection district of Vermont. The port of entry is Burlington, Vt. Application was made to the collector of customs at that place for the amount of revenue collected, but no answer received. Fort Montgomery, Rouse's Point, is the nearest fort; nearest light-house, Point au Roche. It is impossible to state the amount of commerce which will be benefited by this improvement, but it can be said that it will greatly facilitate traffic and commerce with all the west shore line of Vermont extending north from Burlington to and inclusive of Missisquoi Bay.

I am, general, very respectfully, your obedient servant,

G. L. GILLESPIE,
Major of Engineers, Bvt. Lieut. Col., U. S. A.

Brig. Gen. H. G. WRIGHT,
Chief of Engineers, U. S. A.

REPORT OF MR. D. WHITE, ASSISTANT ENGINEER.

FORT MONTGOMERY,
Rouse's Point, N. Y., November 11, 1881.

COLONEL: I have the honor to submit the following report on the examination and survey of the "Gut," made in accordance with your directions under date of October 6, 1881.

The passage in Lake Champlain, lying between the islands North and South Hero, Vermont, known as the "Gut," is about 2 miles in length, and the navigable part varies in width from 60 feet at the entrance and 100 feet at the exit, where buoys are placed, to about 4,000 feet a little east of the center. Its entrance is about 19 miles south of Rouse's Point, the outlet of the lake. It is the main water communication between the commercial channel on the western, and Swanton Harbor and Saint Albans Bay on the eastern side of the lake. This passage is in use by both steamers and sail craft engaged in the general and local commerce of the lake. The passage along its channel, as will be seen by the soundings shown upon the chart herewith respectfully sent, carries an average depth of about 10½ feet, and has sufficient width, except at two points, its entrance at the western and its exit at the eastern end, where, by the formation of bars, extending from either shore, the channel has become narrowed at these places to about 60 feet at the entrance and about 100 feet at the exit.

The volume of water in the passage has no permanent set of current, but an ebb and flow, according to the direction and force of the winds, which at times during our operations amounted to 1,500 feet per hour either way.

The bar at the entrance of the passage consists of bowlders of various sizes, closely packed together, and the interstices filled with tenacious clay, sand, and gravel, and the surface of the bar is thickly strewn with bowlders, large and small. Just inside this entrance, and a little to the left, are two large and dangerous bowlders, the respective positions of which are indicated on the chart by the letters X and Y, upon either of which is less than 2 feet of water.

The bar at the exit is made up of gravel, clay, sand, and small bowlders. There is also a dangerous rock here, lying in the direct course between the exit and "Ludd's Wharf," the position of which is marked on the chart by the letter N, and upon which is only 6 feet of water. It is at these two points, the entrance and exit, where improvements are mainly required.

During the prevalence of heavy northeasterly and northwesterly winds the water rolls into the passage with great force, rendering its navigation most hazardous, and it is not infrequently the case that vessels have to pass each other in these narrow places at these times.

As a relief to navigation it is asked that the channel at these points, entrance and exit, be enlarged to 250 feet in width, and the dangerous rocks and loose bowlders alluded to be removed.

In view of the importance of this passage to the well being of both general and local commerce of the lake, I would respectfully propose the widening of the channel at the entrance and exit and the removal of the dangerous rocks.

The estimated cost of the work is as follows, viz :

5,969 cubic yards of dredging at the entrance, at 50 cents	$2,984 50
2,246 cubic yards of dredging at the exit, at 35 cents	786 10
For removing dangerous rocks, &c	500 00
Contingent	629 40
Total	4,900 00

Very respectfully, your most obedient servant,

D. WHITE,
Assistant Engineer.

Col. G. L. GILLESPIE,
Major of Engineers, U. S. A.

47TH CONGRESS, 1st Session. } SENATE. { EX. DOC. No. 36.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING

Copy of report from Capt. C. J. Allen, Corps of Engineers, upon an examination of Cannon River, Minnesota, with a view that it may be added to the reservoir system of the Upper Mississippi.

JANUARY 5, 1882.—Referred to the Committee on Commerce and ordered to be printed

WAR DEPARTMENT,
Washington City, January 4, 1882.

The Secretary of War has the honor to transmit to the United States Senate, for the information of the Committee on Commerce, a communication from the Chief of Engineers, dated the 23d ultimo, and accompanying copy of report from Capt. C. J. Allen, Corps of Engineers, upon an examination, made in compliance with provisions in the river and harbor act of March 3, 1881, of Cannon River, Minnesota, with a view that it may be added to the reservoir system of the Upper Mississippi.

ROBERT T. LINCOLN,
Secretary of War.

The PRESIDENT *pro tempore*
of the United States Senate.

OFFICE OF THE CHIEF OF ENGINEERS,
UNITED STATES ARMY,
Washington, D. C., December 23, 1881.

SIR: I have the honor to submit herewith a copy of a report to this office from Capt. C. J. Allen, Corps of Engineers, of the results of an examination, under his direction, of Cannon River, in Minnesota, with a view that it may be addded to the reservoir system of the Upper Mississippi, made to comply with requirements of the river and harbor act of March 3, 1881.

Very respectfully, your obedient servant,

H. G. WRIGHT,
Chief of Engineers, Brig. and Bvt. Maj. Gen.

Hon. ROBERT T. LINCOLN,
Secretary of War.

EXAMINATION OF CANNON RIVER, MINNESOTA, WITH A VIEW TO ITS BEING ADDED TO THE RESERVOIR SYSTEM OF THE UPPER MISSISSIPPI.

ENGINEER OFFICE, UNITED STATES ARMY,
Saint Paul, Minn., December 9, 1881.

GENERAL: I have the honor to render the following report upon the examination of the Cannon River, as required by the terms of section 2, river and harbor act, approved March 3, 1881. The act reads:

> The headwaters of the Cannon River, in Minnesota, with a view that the same may be added to the reservoir system of the Upper Mississippi.

The amount of funds available from the general appropriation for examinations and surveys being necessarily small in proportion to the work required, a general examination of the most prominent parts of the Cannon River basin only could be made in connection with a study of existing State and county maps and some data extant.

Mr. J. P. Frizell, assistant engineer, was charged with the immediate examination of the ground. His report is herewith.

By inspection of the report it appears that the drainage area tributary to the river is about 1,350 square miles.

The average annual precipitation at Saint Paul is about 30 inches, and assuming that the precipitation over the drainage area of the Cannon River is not less than that at Saint Paul, and that one-third of it finds its way into the stream, we should have an annual supply of about 31,350,000 cubic feet, equivalent to a uniform discharge of about 1,000 cubic feet per second throughout the year.

Assistant Frizell notes the waste in the early part of the past season of something over 3,000,000,000 of cubic feet of water at Faribault alone for want of means to control and utilize it in the interest of mills at that point, equivalent to about 110 cubic feet per second for an entire year, or, for 100 days about 400 cubic feet; and is of opinion that reservoir capacity for upwards of 5,000,000,000 cubic feet can be obtained at the lakes feeding the stream above Northfield.

Until full examinations and surveys can be made, however, nothing like a definite estimate of the public benefit to be derived from, or the cost of, such reservoirs can be rendered.

The low-water discharge of the Cannon River is not, at present, known.

In a report upon this stream, published as House Ex. Doc. No. 58, Thirty-ninth Congress, second session, 1867, a gauging is reported at a point just above the mouth of the Little Cannon, showing a discharge of about 40,000 cubic feet per minute, or about 666 cubic feet per second.

The corresponding discharge into the Mississippi would, of course, be greater.

The stage of water at the time the gauging referred to was made was above that of low-water.

An increment of a few hundred cubic feet per second to the low-water discharge of the Mississippi River below the mouth of the Cannon would not, of itself, be of value to the navigation of the former.

If the reservoir system ever attains the development of which it is believed capable, the Cannon, like other streams of similar size and watershed, would necessarily be included.

The power of the stream is now largely utilized in operating flouring mills at Morristown, Faribault, Northfield, and other points, and it seems

more than probable that reservoirs, to be operated solely in the interest of navigation, would, at this present, be more detrimental to the milling interests than of benefit to the public.

The report of Mr. Frizell and the letter of Mr. Bean, herewith, furnish evidence of the manufacturing interests dependent upon the power of the stream. No statistics pertaining to the Mississippi have been presented, as such are contained in the reports of the officer in charge of the improvement of that river.

I inclose with this a sketch of the river and its sources above Northfield, drawn on a scale of one-third inch to the mile.

Very respectfully, your obedient servant,

CHAS. J. ALLEN,
Captain of Engineers.

Brig. Gen. H. G. WRIGHT,
Chief of Engineers, U. S. A.

REPORT OF MR. JOSEPH P. FRIZELL, ASSISTANT ENGINEER.

UNITED STATES ENGINEER OFFICE,
Saint Paul, Minn., August 27, 1881.

SIR: Cannon River rises in Rice County, Minnesota, being the outlet of Shields Lake.

It flows westerly into Le Sueur County, then turning to the eastward re-enters Rice County, and passing through Rice, Dakota, and Goodhue counties joins the Mississippi at Redwing, some 40 miles below Saint Paul.

It drains an area of about 1,350 square miles, lying mostly 300 or 400 feet above the Mississippi at Redwing.

As might be expected, the waters furnish in this descent numerous opportunities for the development of water power. Mills, devoted mainly to the manufacture of flour, are in operation at many points on the stream, notably at Morristown, Faribault, Cannon City, Dundas, Northfield, Waterford, Granville, and Cannon Falls. The owners of these mills are associated in what is called the Cannon River Manufacturers' Association, a corporation originally chartered by the State of Minnesota under the name of the Cannon River Improvement Company, for the purpose of making the river navigable by means of locks and dams. Its present purpose is the improvement of the river, in respect of water power, by the construction of storage reservoirs. Some surveys have been made by this company, the results of which have been communicated to me by their engineer, Mr. R. H. L. Jewett, and form a part of the data of this report.

It is understood to be at the instance of this association that these examinations are made, they alleging that reservoirs on this stream would be as beneficial to the Mississippi as at any other point, and, at the same time, would be of great incidental benefit to the manufacturing interests on the stream.

In accordance with your instructions, I have visited and examined nearly all the lakes suggested as reservoirs, and have procured and studied the county maps of this region, from which much valuable information is derived.

The peculiarity of the upper part of this stream is a chain of lakes through which it flows at intervals, during the first 50 miles of its course. It issues, as above stated, from Shields Lake, which lies in close proximity to Mud Lake and Lake Mazaska. The three together cover something like 4 square miles. The last-named lake has no open connection with the others, though one could easily be made.

These lakes command but a small drainage area, and would probably be of little value as reservoirs.

Next below comes Rice Lake, containing some 300 acres. Then comes Lake Dora, containing some 700 acres, which might be flowed by a dam across the Cannon, forming, with adjacent marshes, a reservoir of probably 1,000 acres. Farther down, we come to Lake German, containing some 500 acres, which might be raised 15 feet, forming, with adjacent lakes and marshes, a reservoir of over 1,000 acres in area. Next we come to Sabre Lake, containing some 275 acres, that might be flooded to the depth of 12 or 15 feet. Next comes Lake Tetonka, containing over 1,400 acres, and Sakatah, of about the same area.

These could both be raised by a single dam, the only serious impediment to such a project being the little village of Waterville, at the head of Lake Sakatah.

This might be defended by a dike and drained by windmills at a moderate expense.

Next below the last-named comes Cannon Lake, containing 1,300 acres, then Wells Lake, containing, with adjacent marshes, some 500 acres.

These are both controlled by the dam of the Polar Star Mill, at Faribault, which might be raised considerably higher. All these lakes lie on the main stream, which would probably supply all the water that the lakes could hold at any practicable elevations of their surfaces.

The following lakes lie on tributary streams, namely: at the head of the Little Cannon, which enters the main stream above Lake Tetonka, are Lakes Jefferson, German, and Bossuot, all controllable by one dam and containing, in the aggregate, with adjacent marshes, about 4,000 acres. Horseshoe Lake, discharging into the Cannon below Lake Sakatah, contains over 400 acres, and could be raised 6 feet or more by a very inexpensive dam.

Mud Lake, at the head of Devil Creek, contains over 400 acres, and commands a considerable drainage area. Roberd's Circle and Union lakes contain, in the aggregate, ever 2,000 acres, and command considerable drainage grounds. The first discharges into the Cannon above Faribault; the two latter between Faribault and Northfield.

There are no sites for reservoirs on the main stream below this point. The Straight River joins the Cannon at Faribault. This drains a region of some 400 square miles in area, being nearly the whole of Steele County. No eligible sites for reservoirs are known to exist on this stream.

From the dimensions of the wasteway of the Polar Star Mill, at Faribault, and the statements of the proprietors as to the depth and duration of the flow, it appears that something over 3,000,000,000 of cubic feet of water ran to waste there in the early part of the present season, calling for a reservoir capacity of 4,000,000,000 or 5,000,000,000, in order to reduce the stream, at that point, to a uniform volume at all seasons. The indications are that this amount could be obtained at the several lakes above mentioned.

The subsoil throughout this entire region is a clay gravel, furnishing excellent foundations for hydraulic embankments, and admirable material for the construction of the same.

The fall from Faribault to the Mississippi, as appears by the levels of the Milwaukee and Saint Paul Railroad, is something over 300 feet.

There can be no question as to the value of this system of reservoirs to the manufacturing interests on the Cannon River. The quantity of water wasted at the Polar Star Mill would, if impounded in reservoirs and drawn according to necessity, furnish 100 cubic feet per second for an entire year. The numerous mill-pounds on the stream, in connection with the great reservoirs of Wells and Cannon lakes, immediately above Faribault, would furnish the means of concentrating this quantity into the working hours of the secular day, giving for purposes of water power 200 cubic feet per second. This, on the total fall above stated, would give, after making due allowance for losses of head, nearly 5,000 horse powers, worth, for milling purposes, about $100,000 per annum, though this by no means represents the total increase of power due to such a system of reservoirs. This estimate assumes, of course, that the system of reservoirs could be used wholly in the interest of manufacturing, and that the entire fall of the stream is utilized, as it undoubtedly will be in a few years.

The above refers to the system of reservoirs above Faribault. Those which discharge into the river below that point would be of additional benefit. It must be remembered that a stream flowing from a clay region like this is much more susceptible of benefit from reservoirs, and much less valuable for mill purposes without such agencies, than a stream flowing from a sandy district. The ground acts as a reservoir to a much greater extent in the latter case than the former, and the fluctuations of volume do not take so wide a range.

As to the benefit to the navigation of the Mississippi to be expected from this system of reservoirs, it is to be observed that the opportunities offered here for the storage of a limited quantity of water are perhaps as good as some that have been examined and surveyed. A system of reservoirs on a sufficiently extended scale to reduce the flow of the Upper Mississippi to uniformity, or any decided approach thereto, would necessarily include these sites. No occasion can be perceived, however, for immediate action in the matter, as more favorable sites have been surveyed in sufficient number to absorb all the funds likely to be devoted to this use for many years.

As to whether this system of reservoirs could at the same time be of full benefit to the Mississippi River and also to the interests of manufacturing on the Cannon, there are the following observations to be made:

Reservoirs are expected to be of benefit to the Mississippi in two ways:

1. By restraining floods.
2. By increasing the low-water volume.

As regards the first function, all reservoirs are equally beneficial. As regards the second, reservoirs controlled in the interest of navigation might, and under any cir-

cumstances likely to arise would be so used as to be of little benefit to manufacturing, and *vice versa*. The interests of manufacturing are best served by a uniform volume of the stream at all seasons.

The interests of navigation on the Mississippi would usually require the contents of the reservoirs to be discharged in the course of two to four months and the total flow of the stream to be held back during the rest of the year. Rivers in Minnesota are peculiarly liable to low-water in the winter. Mills on the Cannon River had much trouble from this cause last winter, as did those at Minneapolis and elsewhere. It is obvious that reservoirs operated in the interest of navigation could be of no benefit to manufacturing during this period, no discharge being required. Moreover, the appropriation by the government of all the available reservoir sites on the stream, for the purpose of improving the Mississippi, would forever put it out of the power of manufacturers to realize the full benefits of the storage of water.

The divergence between the use of reservoirs as aids to navigation and their use as aids to water-power may be expected to grow less and less as the reservoir system is extended. If we should suppose the system carried to its ultimate extent, the extent of impounding all the water of the river, or of its upper part, this divergence would disappear altogether.

In that case the river and all its tributaries would be reduced to a uniform, or nearly uniform, flow, at all seasons of the year, a condition alike favorable to navigation, manufacturing, and all other interests, and all reservoirs, for whatever purpose constructed, would contribute equally to this result. At some future time such a condition may be realized, but it is now too remote for consideration in this connection.

Very respectfully, your obedient servant,

JOS. P. FRIZELL,
Assistant Engineer.

CHAS. J. ALLEN,
Captain of Engineers and Brt. Major, U. S. A.

LETTER OF MR. F. A. BEAN, SECRETARY CANNON RIVER MANUFACTURING ASSOCIATION.

FARIBAULT, MINN., *November* 25, 1881.

SIR: Your letter of September 23, in relation to Cannon River, was, I regret to say, for a time overlooked. I can assure you, however, that the delay was not occasioned by indifference, for the retention of the water of the lakes in times of freshets, and its gradual release as it would be needed in the Mississippi, would add greatly to the capacity of the numerous water powers along the river. Perhaps there is no other river in the Northwest of equal length with so many water powers so evenly distributed, for on the last 75 miles, where it flows through the very best and most populous portion of the State, there are at least twenty good powers, most of which are improved, situated from 1 to 5 miles apart, thus furnishing cheap and constant power at the very doors of the people of the whole valley.

It is estimated that when the capacity of the river shall be fully developed it will furnish power to grind the flour to feed, and manufacture cloth to clothe, the people of the three States of Wisconsin, Iowa, and Minnesota.

The conversion of the lakes into reservoirs, as proposed, would serve the interests of all manufacturers on the river, and would be sure to receive their co-operation and support.

Hoping that upon examination you will find the lakes of Cannon River of sufficient importance to claim the attention of the general government,

I remain, respectfully, yours,

F. A. BEAN,
Secretary Cannon River Manufacturing Association.

Maj. CHARLES J. ALLEN,
Captain of Engineers.

BSB Bayerische StaatsBibliothek
MDZ Münchener DigitalisierungsZentrum Digitale Bibliothek

Senate documents

Bd.: [345.] 1881/82, Vol. 1 = Congress 47, Sess. 1

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Am.b. 3040-345,1
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